

Optimizing dosage of Ketamine and Xylazine in Snow leopard (*Uncia uncia*) at Padmaja Naidu Himalayan Zoological Park, Darjeeling

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Abstract

Ketamine hydrochloride (ketamine HCl) a nonbarbiturate anesthetic chemically designated as (±)-2-(o-Chlorophenyl)-2-(methylamino) cyclohexanone and Xylazine hydrochloride a non-narcotic compound chemically designated as 2-(2,6-dimethylphenylamino)-4H-5,6-dihydro-1,3-thiazine has become a popular anaesthetic combination for surgical procedures particularly in the felines and canines and this drug combination is said to have a wide safety margin and especially suitable for larger carnivores. In the present study, a combination of Ketamine hydrochloride and Xylazine hydrochloride have been successfully used in captive Snow leopards (*Uncia uncia*) for various managerial needs and surgical procedures.

Introduction

Chemical restraint can be extremely useful as an aid to diagnostic or minor surgical procedures or in the control of animals which have a potentially dangerous temperament. Selection of appropriate combinations and doses of drug to provide ideal restraint for the spectrum of patients and procedures encountered in clinical practice requires experience of a wide range of agents and their effect in different circumstances. A suitable combination for a particular individual may be completely ineffective in another animal of similar breed and size, but different temperament, undergoing the same procedure. The administration of chemical restraint is a difficult procedure therefore this study conducted have been able to determine effective doses for snow leopards in captivity. The study was conducted from 2002-2013. Ketamine with or without Xylazine has been routinely used for immobilization in snow leopards

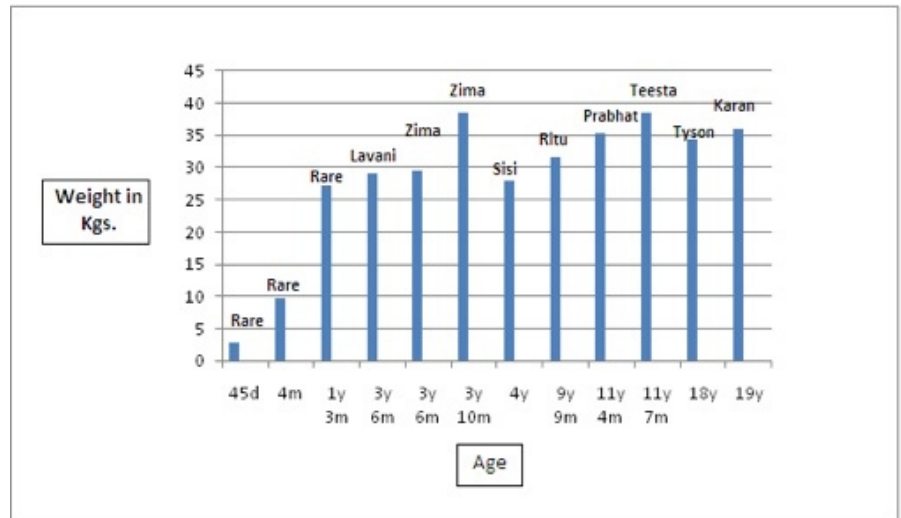


Fig. a Body weight in comparison with animal age

(Jalanka 1989). Also, the use of medetomidine and its reversal agent atipamezole has been reported to be very useful in snow leopards. For surgery, inhalation anesthesia has been routinely used although in one reported case the patient exhibited a persistent hypercapnia, possibly related to poor ventilation during the procedure.

The SLCMS indicated that 100% of participating institutions used Ketamine for immobilization with 50% of those combining ketamine with diazepam or Xylazine. The most commonly used inhalation anesthetic was isoflurane followed by halothane. Yohimbine has been used as an antagonist in snow leopards. Problems during anesthetic procedures include seizures, vomiting and excess salivation. Most snow leopards fully recover from anesthetic 2-3 hours after immobilization (Wharton *et.al.* 1997).

METHODS:

Animals

From July 2002 to June 2013 there has been a total of 20 times of tranquilization of the captive snow leopards of Padmaja Naidu Himalayan Zoological Park.

General procedure:

Individual animals are weighed with their individual cage on a 500 kg digital scale. Body weights are estimated by difference and drug doses prepared accordingly. Animals are then physically restrained and given intramuscular injection using Ketamine-Xylazine HCl combination.

Pre-anesthetic considerations:

- 1 The animal is kept off fed prior to anesthesia.
2. Immobilization is planned during the coolest part of the day if done during the season when the ambient temperature is high.
3. Body positioned correctly to insure that nothing interferes with respiration.
4. Vital signs monitored – respiration and heart rate.
5. Body temperature monitored.
6. Eye reflex checked and eye covered with cloth.

Result

The optimum dose used for the snow leopards at the park has also been compared with other zoos.

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Discussion

Ketamine and Xylazine (KX) mixture is the most commonly used anaesthetic drug to induce sedation and immobility. Reports on doses of anesthetic agents for safe and effective immobilization of snow leopards in India are very limited. In the following study it was observed that the anesthetic agents used for a period of time, was that maximum dose was used for an animal of 40 kg body weight. Inj Ketamine-4 ml and Inj Xylazine-0.8 ml, for which as reported the recovery time or head up condition was after 2-3 hours. This duration can have adverse effects on the health of the animal and provides greater risk to the life of the animal, but later during the study when Inj ketamine – 2ml and Inj Xylazine-0.4 ml was used in combination for the animal having the same body weight the dose was found to be adequate in several circumstances with lesser risk on the animal. In such a combination, the respiratory and the heart rates were stable and rectal temperature normal. The duration of anesthesia during the study was sufficient for treatment, morphometric measurements, and blood sampling. No life-threatening adverse effects of immobilization were documented, thus the following combinations can be considered effective for the immobilization of snow leopards.

Conclusion

The study conducted for the immobilization of the snow leopard can act as a ready reference for a safer immobilization of the individuals in captivity and thus can be concluded that the Ketamine HCl - Xylazine HCl combination can be used safely and effectively in the dose as according to the findings in the study.

References

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Table I

Anesthetic Agents	Dosage	Drug used in zoos as per the content per ml
Ketamine	5-10mg/kg b.wt /Im/ly	100mg/ml
Xylazine	1-2mg/kg b.wt Im/ly	100 mg/ml

Table: II. Anaesthetic successes have been summarized

Sl No.	Animal name	Sex/Age (Year/ Month)	Body weight (Kg)	Date when Tranquilized	Dose of drug used
1	Tyson	M, 7	36	28.07.2002	Ketamine- 4 ml Xylazine- 0.8 ml
2	karan	M, 7/1	37	16.10.2002	Ketamine- 4 ml Xylazine- 0.8 ml
3	Tyson	M, 7/1	38	10.11.2002	Ketamine- 4 ml Xylazine- 0.8 ml
4	Karan	M, 7/8	37	07.03.2003	Ketamine- 2.5 ml Xylazine- 0.5 ml
5	Tyson	M, 7/4	36	26.04.2003	Ketamine- 4 ml Xylazine- 0.8 ml
6	Tyson	M, 7/10	37	13.06.2003	Ketamine- 5 ml Xylazine- 1 ml
7	Tyson	M, 7/11	37	25.07.2003	Ketamine- 3.5 ml Xylazine- 0.7 ml
8	Prabhat	M, 1/6	32	25.03.2004	Ketamine- 2 ml Xylazine- 0.4 ml
9	Prabhat	M, 2	33	28.09.2004	Ketamine- 3 ml Xylazine- 0.6 ml
10	Prabhat	M, 2/1	33	01.10.2004	Ketamine- 4.8 ml Xylazine- 1 ml
11	karan	M, 9/5	38	01.03.2005	Ketamine- 4.8 ml Xylazine- 1 ml
12	Budh	M, 4/1	36	01.07.2006	Ketamine- 2.5 ml Xylazine- 0.5 ml
13	Tyson	M, 12/4	38	14.12.2007	Ketamine- 2.5 ml Xylazine- 0.4 ml
14	Prabhat	M, 7/7	38	28.01.2010	Ketamine- 2.5 ml Xylazine- 0.4 ml
15	Prabhat	M, 7/10	38	16.07.2010	Ketamine- 3.5 ml Xylazine- 0.7 ml
16	Tyson	M, 17/3	38	08.11.2012	Ketamine- 2.8 ml Xylazine- 0.6 ml
17	Prabhat	M, 11/9	38	10.06.2012	Ketamine- 2.5 ml Xylazine- 0.5 ml
18	Prabhat	M, 11/9	38	17.06.2013	Ketamine- 2.5 ml Xylazine- 0.5 ml
19	Prabhat	M, 11/9	38	22.06.2013	Ketamine – 2ml Xylazine- 0.4 ml
20	Tyson	M, 17/11	37	17.06.2013	Ketamine – 2ml Xylazine- 0.4 ml

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