

Management of biting injuries in mandrills *Mandrillus sphinx*: a case report

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Abstract

Mandrills, *Mandrillus sphinx* are old world monkeys. In India, it is an exotic species and only a few zoos have maintained them in captivity. Information on their captive management and veterinary care are meagre. This report brings forward the management of injuries in mandrills caused by aggression between the males. The animal was sedated keeping the Rhesus macaque as model, which resulted into successful sedation followed by smooth recovery. In the report, emphasis has been given on chemical immobilization and normal physiological data of mandrills.

Introduction

Mandrills are the most colourful primate and mostly live in tropical rainforests and forest-savannah mosaics. Morphological description of the animal is characterized by the olive green or dark grey pelage with yellow and black bands, hairless face with elongated muzzle and upper canines, red nostrils and lips and white belly (West *et al.* 2007) (Fig 1). Tata Steel Zoological Park, Jamshedpur procured mandrills of age group 8-10 years from Tisch Family Zoological Garden, Jerusalem, Israel. Two males and three females have been maintained in zoo with successful breeding ratio. Management of mandrills in captivity is difficult and chances of aggression are more in mandrills as compared to macaques. Regarding this fact, small male mandrill, Erick accidentally came in the contact of dominant male mandrill, Drror, through grilled partition. The infighting between the males resulted severe injuries to Erick and few abrasions to Drror. Detailed observations revealed open wounds exposing the muscles in left arm and right shoulder area in Erick while mild abrasions on chest and forehead in Drror. Immobilization of the male mandrill, Erick, became necessary so as to suture the open wounds properly. There is brief information available on tranquilization of mandrills using Ketamine-Xylazine. Due to the unavailability of gaseous anaesthesia at zoo hospital, Ketamine-Xylazine anaesthesia was the only option to assist in the clinical process. Nevertheless, amount of anaesthetic was calculated, keeping the rhesus macaque as model, to bring down the animal.

Anaesthesia / Immobilization

Due to the inbuilt squeeze cage, it was not possible to capture both males at the same time. Taking into consideration the severity of wounds, Erick was preferred to be captured in the squeeze cage. After getting the animal (Erick) in squeeze cage, initial loading dose of 0.15 ml Ilium Xylazil 100 (Xylazine hydrochloride 100mg/ml, Troy Lab, Australia@ 1mg/kg body weight) and 0.15 ml Ketamil (Ketamine hydrochloride 100mg/ml, Troy Lab, Australia@ 1mg/kg body weight) was given intramuscularly to induce the anaesthesia. Animal became lethargic after 10 minutes, but it was responding to noise and touch. This stage was not suitable to carry out even the



Fig 1. Mandrill at Tata Steel Zoological Park, Jamshedpur



Fig 2. Open wound exposing the muscles on the shoulder area

minor surgical procedure. Hence, to achieve the surgical stage of anaesthesia, additional dose of Xylazine and Ketamine (Total 0.2 ml in the ratio of 1:1) was given intramuscularly. Animal became unconscious after 35 minutes of induction dose.

Surgical Procedure

Detailed examination revealed wounds on medial surface of left arm measuring about 2" x 2" x 1/2" and on shoulder area measuring about 2" x 1" x 1" (Fig 2). Animal was also examined for the normal respiration rate and temperature. After finding the biological data normal, surgery was performed. A detail of the veterinary treatment given to both the mandrills has been described in Table 1.

Post-operative Treatment and Care

After 15 days, Erick was again administered with the same amount of anaesthetics for removal of sutures.

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Table 1: Veterinary treatment administered to the mandrills

SN	Name of the Mandrill	Period	Particulars	Medicines/Procedure	Remarks
A	Male mandrill (Erick)	Day 1	Total dose of Anaesthesia	Ilium Xylazil 100 (Xylazine hydrochloride 100mg/ml, Troy Lab, Australia) – 0.25ml IM	--
				Ketamil (Ketamine hydrochloride 100mg/ml, Troy Lab, Australia) - 0.25ml IM	
			Cleaning of wounds	Metricare IU solution (Povidone iodine – 5% and Metronidazole 1%, Zydus Animal Health Ltd, India)	--
			Suturing of the skin	20G silk thread using straight needle in horizontal mattress pattern (Fig 3). After suturing the wounds	--
			Antiseptic dressing	Nebasulf powder (Neomycine, Bacitracine and Sulphonamide, Pfizer Ltd, India)	--
			Medication	Tetanus vaccine (Tetanus toxoid) – 0.5 ml Intramuscular Inj C-flox Power (Ciprofloxacin 100mg/ml, Intas Lab, India) – 1.5 ml Intramuscular	--
		Recovery from anaesthesia	Inj Reverzine (Yohimbine hydrochloride 10mg/ml, Bomec Pty Ltd, Australia) - 0.5 ml Intravenous	Whole process took around 1 hour. Animal started responding in next few moments. Remained in drowsiness for next few hours, but consumed banana. complete recovery from anaesthesia after 7 ^{1/2} hours after the induction dose	
		Day 2		Tablet Ciptas-L (Ciprofloxacin 250mg + <i>Lactobacillus sporogenes</i> 20 million CFU, Intas Lab, India) @1 tab Once a day	Suture line was intact. Normal appetite
Day 3 to 5		Tablet Ciptas-L @1 tab Once a day	Normal appetite		
B	Male mandrill (Drror)	Day 1		Tablet Ciptas-L @1 tab Once a day	Active and appetite was normal
		Day 2	Captured in squeeze cage	Cleaning of the abrasions with Metricare IU solution and application of Nebasulf powder.	Normal appetite
				Tetanus vaccine (Tetanus toxoid) – 0.5 ml Intramuscular	
				Inj C-flox Power (Ciprofloxacin 100mg/ml, Intas Lab, India) – 1.5 ml Intramuscular	
		Day 3	Signs of limping with the left fore limb	Tablet Ciptas-L @1 tab Once a day	Normal appetite
				Tablet Combiflam (Ibuprofen and Paracetamol, HMR Pharma, India) @ 1 tablet once a day	
Day 4 and 5		Tablet Ciptas-L @1 tab Once a day	On day 6, behaviour was normal and no other clinical signs were noticed		
		Tablet Combiflam (Ibuprofen and Paracetamol, HMR Pharma, India) @ 1 tablet once a day			

Blood (Approximately 5ml) was also collected from the Saphenus vein for laboratory examination. Nevertheless, both the animals were alert and the appetite was also normal. Laboratory examination report of the blood sample collected from the male mandrill, Erick, is given in the Table 2. It is compared with the normal haemogram of rhesus macaque (*Macaca mulatta*) as model (Robinson & Ziegler 1968; Benjamin 1979). All the values are similar to those of rhesus macaque except higher neutrophils and total platelet count in mandrills. This might be the result of recent injuries. However, to

statistically justify the obtained data and to establish species variation, number of samples needs to be more. Nevertheless, the comparison may be useful for the zoo vets as future references.

Discussion and conclusion

Xylazine is an α2-adrenoceptor agonists (α2-agonists) and much of the research on α2-agonists has been performed in dogs whose physiological responses differ from primates. In both primates and humans, the negative cardiopulmonary effects of α2-agonists are minor and not clinically noticeable (Dyck

Table 2: Normal haemogram of male mandrill at Tata Steel Zoological Park, Jamshedpur

Parameter	Unit	Mandrill <i>Mandrillus sphinx</i>	Rhesus macaque <i>Macaca mulatta</i> (Robinson and Ziegler, 1968)
Total Erythrocyte Count	millions/ μ l	4.48	4.48 \pm 0.63
Haemoglobin	g/dl	12.9	12.5 \pm 1.5
PCV (Haematocrit)	%	39.1	40.3 \pm 3.5
Mean Corpuscular Volume (MCV)	fl	87.3	91.5 \pm 11.7
Mean Corpuscular Haemoglobin (MCH)	pg	28.8	28.2 \pm 2.7
Mean Corpuscular Haemoglobin Concentration (MCHC)	%	33	31.0 \pm 2.7
Total Leucocyte Count	thousand/ μ l	9.05	11.5 \pm 4.3
Neutrophils	%	55	22.7 \pm 11.1
Lymphocyte	%	41	68.7 \pm 11.9
Eosinophils	%	04	5.0 \pm 5.3
Monocyte	%	00	3.9 \pm 2.8
Basophils	%	00	0.2 \pm 0.6
Total Platelet Count	thousand/ μ l	278	418 \pm 115

**Fig 3. Suturing in horizontal mattress pattern**

et al. 1993; Horne *et al.* 1997; Capuano *et al.* 1999). It is suggested for the primates weighing greater than a few kilograms can be anesthetized with 5 mg/kg ketamine and 0.05 mg/kg α 2-agonists/medetomidine IM and most primates sleep with this combination for approximately 45 to 60 minutes and recovery is also quick (West *et al.* 2007). However, in the present case report, 1mg/kg Xylazine and 1mg/kg Ketamine (considering the body weight of male mandrill, Erick as 15-16 kg) resulted into good surgical anaesthesia while maintaining all the physiological parameters to normal.

There is no antagonist for Ketamine but in combination doses, the whole effect is reversed by the use of α 2-adrenoceptor antagonists. The most specific alpha2-adrenoceptor antagonist, atipamezole, is recommended in primates (Haapalinna *et al.* 1997; Aantaa 2000). In the present case report, Yohimbine has been proved to be a good reversal agent for Xylazine. Mandrills are less in captivity and information on veterinary management is insufficient, therefore; this research report provides opportunity to explore new ideas to manage them successfully in captivity. At Tata Steel Zoological Park, Jamshedpur, successful breeding ratio shows the appropriate management of

mandrills in captivity. However, aggression between males is very common in non-human primates and present case report on anaesthesia and surgical procedure can be used as reference in the future cases.

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