

## Rhino Translocation in Assam Under Medetomidine Anaesthesia

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### Abstract

Five one horn Asian rhinos were translocated from Kaziranga National Park to Manas National Park to re-establish the lost population. They were darted to anaesthetize by medetomidine (20µg/kg) - ketamine (200mg/rhino) combination. Sternal recumbency was attained at  $8.6 \pm 2.24$  minutes of darting and the rhinos were maintained under anaesthesia for  $39.25 \pm 3.12$  minutes, thereafter the rhinos were placed inside cages. During anaesthesia, a radio collar was fitted to the neck of the rhinos and then they were reversed from anaesthesia by IV injection of atipamezole @ 20µg/kg. Azaperone (140mg/rhino) was injected IM following reversal. The rhino-loaded cages were placed on a truck and translocated to the destination during the night hours. In the next morning they were released inside the electric fenced area of the park.

Key words : Translocation , Rhino, medetomidine, atipamezole, azaperone

Translocation means transportation of an animal from one place to another. This is commonly applicable in case of wildlife with a purpose to reduce the increased population of particular forest or to revive the lost population in another park. It is generally targeted for conservation of a particular species. Therefore, a few female and a male animal are generally translocated to a jungle for propagation of the species. In this task it is always kept in view that the female and the male animals are selected from different jungles to avoid inbreeding of the offspring. If special care is initiated to protect the translocated animals in their new homeland, they will adapt well, reproduce their own and this wild species will be saved from extinction. As such, rhinos from Kaziranga National Park were successfully translocated to Manas National Park.

### Materials and Methods

Five one horn Asian rhinos were initially darted by using a mixture of Medetomidine (20µg/kg) and Ketamine (200mg/rhino) anaesthesia of which four were translocated. These rhinos were rescued at a very young age (approximately 100kg body weight) by Wild Life Trust of India and reared in their rescue centre until they grew up to 1000 kg body weight approximately. The animals came to sternal recumbent position following darting, then they were placed in a sleigh and tied with jute rope. The sleighs were pulled near to the cages by a crane and the rhinos were placed inside the wooden cage. During anaesthesia, heart rate was recorded by a stethoscope, respiration was counted from the exhalation by putting the hand near nostrils, and rectal temperature was recorded by placing a thermometer in the anus. A radio collar was fitted around the neck of each anaesthetized rhino. Thereafter, Atipamezole @ 20µg/kg was injected into the ear vein to reverse the anaesthetized rhinos. The rhino stood up inside the cage and was immediately injected with a mild tranquilizer Azaperone @ 140 mg / rhino as total dose. The

rhino along with the cage were lifted onto a truck by a crane and the cage was tied to the body of the truck. Water was sprinkled on the body of the rhino. The truck moved at 40 km/hr speed during the night to reach the Manas National Park, the destination of translocation. A team of Veterinary experts along with forest officials and media persons accompanied the rhino-bearing truck. Veterinary experts checked the rhinos inside the cage during transit. Next morning after the destination was reached, the site was prepared for release of rhinos into the electric fenced area (4 square km) of the park which was termed as "boma". A trench was prepared to adjust the height of the truck and positioned so the opened cage was facing towards the release site. An injection of steroid was given to the rhinos as anti stress medication before release to the new homeland. Initially the rhinos were reluctant to move out of the cage but after stimulation they ran into the jungle surrounded by the electric fence. A site for wallowing and drinking water was accommodated inside the fenced area. Radio collars were activated immediately after each animal's release. A few bags of rhino faeces were also placed within the electric fence.

## **Results and Discussion**

Induction time of the anaesthesia was recorded at  $8.6 \pm 2.24$  minutes, when the rhinos became unstable and came to sternal recumbency. Eyes were closed and total relaxation of muscle with flaccidity of tail were observed in all the cases. Heart rate recorded at 15 and 30 minutes of anaesthesia were  $39.25 \pm 1.60$  and  $33.82 \pm 1.33$  per minute. The respiration recorded at 15 min was  $27.20 \pm 2.12$  which reduced to  $25.60 \pm 2.42$  at 30 min. Respiratory depression produced by this combination of anaesthetic was very minimal, where question of hypoxia was not raised. On contrary to this opioid, narcotic induced respiratory depression was associated with severe hypoxia and needed to be injected with respiratory stimulant as reported by Heard et.al. (1992). Slight drop of temperature from  $37.33 \pm 1.20$  to  $37.16 \pm 1.85$  °C recorded at 15 and 30 minutes respectively was due to minor depression of thermoregulatory effect. Sufficiently anaesthetized rhinos permitted the fitting of radio collars as well as to pull them into the cage. Addition of ketamine balanced the bradycardiac affect of medetomidine, which exhibited the variation of heart rate near normal. After induction, the heart and the lungs of the rhinos were examined and dexamethasone was injected to attain cardiac stability. Radio collars were fitted to the neck of the rhinos to investigate their movement after release in the forest. Placing of the rhino on a sleigh made it easier to pull and put inside the cage. The rhinos were under anaesthesia for  $39.25 \pm 3.12$  minutes. To avoid any untoward affect, the rhinos were reversed from anaesthesia by intravenous injection of Atipamezole. The reversal time recorded was  $8.5 \pm 1.89$  minutes, where the rhinos were able to stand. Atipamezole, a specific alpha-2 adrenoceptor agonist has been already proved as an excellent reversal of medetomidine sedation in elephant (Sarma and Pathak, 2004). Following reversal from anaesthesia, the rhinos urinated profusely. Mild tranquilizer, Azaperone (140mg total dose/ rhino) was injected to avoid aggressive behavior of the rhino and to make them anxiety free during transit. The cage was lifted by a crane onto a truck and water was sprinkled on the body of the rhinos to make them cool. Carrying the rhinos at night hours was convenient as the truck traveled through the roads in thickly populated area. Importance was given for full comfort of the rhino inside the cage and the speed limit of the truck was fixed at 40km/hr to avoid jerking.

The rhinos were transported to Manas National Park in the presence of a team of veterinary doctors. At certain intervals, the rhinos were examined inside the cage by the expert team of

veterinarians, which followed just at the back of the rhino bearing truck and thus reached destination in the next morning. The vet team was accompanied by forest officials and the officials of Wildlife Trust of India (WTI). A big team of photographers from discovery channel, Maxico and national newspapers also accompanied the vet team. The rhinos were released inside the electric fence area of Manas National Park, where natural water for drinking and wallowing were available. They were reluctant to move out of the cage initially but following stimulation they ran into the prepared boma area and disappeared under the tall herbs.

Since 1987, medetomidine has been used in non-domestic animals either alone or in combination with ketamine (Jalanka, 1987) but no record has been made of its use in one horn Asian rhino. Medetomidine was used for the first time for translocation of one horn Asian rhinos in Assam (India), which is a global record and found to be very smooth in action. Thus it has proved superiority over the commonly used opioid narcotics which are detrimental to the normal functions of the animal. Adverse side effects with life threatening complications of potent opioid narcotic in African rhino has also been mentioned by Radcliffe et.al. (2000). Threat for opioid induced abortion was not at all present with medetomidine. Moreover, the respiratory distress and cardiac arrest leading to 2.9 % mortality recorded by Alford et. al. (1974 ) following use of the opioids in wild animals was not recorded in rhinos with this particular anaesthetic. Optimum duration and depth of anaesthesia achieved by this drug was sufficient for performing the operations. Thus zero mortality and absence of deleterious affect of medetomidine acclaimed its use in rhino translocation. Ketamine always balanced the action of its partner anaesthetic and alleviate pain. Atipamezole a specific alpha-2 antagonist effectively reversed the medetomidine induced sedation. Azaperone ,a butyrophenon derivative tranquilizer produced calmness of the rhino during transit. The same tranquilizer was also used by Atkinson et.al. ( 2002) in African rhinos to eliminate the life threatening complications of opioid narcotic. Placing of few bags of rhino faeces inside the “boma” was to give an understanding to the translocated rhinos that they were in their own territory. Normally rhino defaecate in a particular place regularly and graze in the surrounding faeces hub. Getting the smell of their own faeces, they recognized their homeland. Thus rhino translocation in Assam under medetomidine anaesthesia was a successful one.

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# REASON OF RHINO TRANSLOCATION

- To introduce rhino in a rhino less forest
- To reduce overcrowding of rhino in a forest
- To rehabilitate rescued rhino
- To prevent inbreeding and to maintain genetic makeup
- To protect them from epizootic

**Fig: Planning of rhino translocation in rescue centre of CWRC, Kaziranga National Park**



# FIG: RHINO IN NATURAL HABITAT OF KAZIRANGA NATIONALPARK





## Fig: Natural habitat of rhino in Kaziranga National Park



# DARTING TIME AND SITE OF RHINO

- Darting should be in winter season
- It is preferable to dart in the morning
- Rhino to be darted should be kept under observation
- Before day of darting it is to be isolated by using trained elephants
- Water body should not be located nearby
- Darting is preferable in front rarely in back

# FIG: DARTING AT FRONT SIDE OF RHINO



# FIG: DARTING AT BACK SIDE OF RHINO



# SELECTION OF ANAESTHETIC

- The anaesthetic used for darting should be very potent and with reliable antidote
- Induction should be quick and smooth
- It should be with wide margin of safety
- It should be safe for pregnant and weak animals
- A balanced anaesthesia should be produced
- Should be able to load in small dart

# ANAESTHETIC USED FOR CAPTURING RHINO

- Medetomidine ( 20  $\mu\text{g}/\text{kg}$  )+ ketamine (200 mg total ) combination
- Medetomidine acts by modulating noradrenaline release on adrenergic nerve terminals
- It has dose dependant sedative effect, excess dose is used to prolong the anaesthetic period but not increasing the anaesthetic depth
- Peak concentration is attained within 15-30 min.
- Induction and recovery are smooth

# REVERSAL OF MEDETOMIDINE

- Atipamezole is the specific reversal
- Inject equal dose of medetomidine into ear vein
- Quickly reversed the rhino within 8.5 min
- Rebound effect is seen with equal dose but absent with double dose.

# FIG : VIALS OF MEDETOMIDINE AND ATIPAMEZOLE





# ANAESTHETIC RECORDS

- Rhino anaesthetized = 5 nos.
- Induction time =  $8.6 \pm 2.24$  min
- Duration =  $39.25 \pm 3.12$  min
- Reversal time after  
atipamezole injection =  $8.5 \pm 1.89$  min

# COMPARISON OF MEDETOMIDINE WITH ETORPHINE

- Zero mortality recorded in different wild and domestic animals. Whereas, 3% standard mortality is recorded for etorphine containing sedative ( Jalanka,1991 )
- Medetomidine safe for pregnant animals but etorphine induces abortion
- Medetomidine is very potent with wide margin of safety
- Medetomidine depress respiration to certain extent but etorphine caused profound respiratory depression leading to hypoxia , respiratory failure and death
- Medetomidine is safe to the handlers but etorphine is life threatening to the anaesthetist

## EXAMINATION OF RHINO DURING ANAESTHESIA

- Assessment of heart beat , respiration and rectal temperature
- Observation of different reflexes, i.e. palpebral ,corneal, anal, paedal etc.
- Injection of life saving drug, if necessary (Dexamethasone)

# Records of heart beat, respiration and Temperature

Duration →	15 min	30 min
Heart beat/ min	39.25± 1.60	33.82±1.33
Respiration/ min	27.20±2.12	25.60± 2.42
Rectal Temperature(°c)	37.33±1.20	37.16± 1.85

## FIG: EXAMINATION OF RHINO DURING ANAESTHESIA



**FIG: RECORDING OF HEART BEAT DURING ANAESTHESIA**



# FIG : RADIO COLLAR BEFORE FITTING



# FIG: DURING FITTING OF RADIO COLLAR





# FIG: RHINO REVERSED WITH ATIPAMEZOLE



# RHINO AFTER CAGING

- Reverse the rhino from anaesthesia
- Inject Azaperone ( 140 mg/ rhino) to maintain tranquility
- Crane lifting of loaded cage onto a truck

Fig: After placing the rhino in the cage



# FIG : CRANE LIFTING OF RHINO



# TRANSPORTATION OF RHINO

- Truck should be at a slow speed
- Transportation should be preferably at night hours
- Veterinary expert team should follow the truck
- Veterinarians should be equipped with all medicines to meet up any eventualities
- Intermittent checking of rhino during transit

# FIG : TRANSPORTATION OF RHINO



Fig: Veterinary expert team following the rhino loading truck



Fig: During transportation of rhino





# FIG: RHINO TEAM ARRIVING AT MANAS NATIONAL PARK



# FIG : RHINO TEAM ENTERING MANAS NATIONAL PARK



# RELEASE OF RHINO IN A NEW HOMELAND

- Placed the truck into a trench to bring the floor into ground level
- Open the door of the cage
- Allow the rhino to move slowly into jungle

## FIG: RELEASE OF TRANSLOCATED RHINO



# FIG: RHINO FROM CAGE TO FOREST



# FIG: RHINO AFTER RELEASE IN MANAS NATIONAL PARK



# AN IDEAL NEW HOMELAND OF RHINO

- New homeland of rhino should have sufficient grassland like its original habitat
- Water body is essential in the translocated forest
- Wallowing place in new forest is mandatory
- At least two rhinos should be translocated at a time

# FIG: POST RELEASE RHINO MONITORING INSIDE ELECTRIC FENCE IN WINTER





# FIG: RHINO HOMELAND IN MANAS NATIONAL PARK



# FIG: POST RELEASE MONITORING OF RHINO INSIDE ELECTRIC FENCE



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**THE END**