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"Immobilization and Relocation of a straying tiger from Human dominated landscape".

"The successful handling of animals with drugs, capture in the wild and restraint for various purpose can ultimately be performed successfully only by those who, at least to a large extent, put the animal first; by those who are guided by a code; as medical doctors and veterinarians are subjected to a code; by those who have an awareness of the value of animal life; and by those who set their sights on the welfare of all the animals with which they work; a goal ethically higher than that of the survival of a species"

-A.M. Harthoorn. 1976

Abstract: In India when a tiger strays into a human-dominated landscape, it results in encounters that require interventions to prevent harm to people as well as the tiger. Such emergency field immobilizations are carried out with limited tools, often amidst large uncontrollable crowds. The crowd not only impedes the challenging operation but also puts their lives at risk. The wildlife patients may be presented in a variety of situations requiring emergent interventions. The present report discusses the steps that need to be followed (1) in an emergency and in critical care of such patients and identifies critical factors that can assist in managing these emergency situations. (2) examine cause of human-tiger conflict. (3) attempt to evaluate the effectiveness of the chemical immobilization and rescue team.

HIGHLIGHTS:

- 1) A tiger strayed into a residential colony of Ramnagar near to the Bijrani Range of Corbett Tiger Reserve (CTR).
- 2) Spotting the tiger created panic among the residents who gathered at the spot, creating ruckus in the area.
- 3) It was presumed that the tiger had been injured in a territorial fight with another tiger and became stray in the residential area to save itself from another attack or in search of easy prey.
- 4) Initially, the forest staff tried to drive the tiger towards the Jungle. But tiger hid itself in a drain, instead of running away towards the forest.
- 5) The rescue operation was carried out late at night, and the tiger was immobilized and rescued by the Veterinary team of Corbett Tiger Reserve.
- 6) The tiger was darted at 1:58 am and at 2:15 am it was captured and loaded into the rescue truck.
- 7) The tiger was released deep into the Jungle at Jhirna Range of CTR.

INTRODUCTION:

Large carnivores, humans and their livestock have co-existed for millennia but, recent decades have seen a dramatic increase in the frequency of human-carnivore conflicts. Human-wildlife conflicts are acute when the species involved is highly imperiled while its presence in an area poses a serious threat to human welfare (Saberwal *et al*; 1994) In many part of the world conflicts with wildlife over damage to crop, property and threat posed by wildlife to human life are significant costs of living adjacent to protected areas (Parry and Campbell; 1992). Today conflict between humans and tiger occurs almost everywhere there are tigers (Barlow *et al*. 2010; Goodrich, 2010 Karanth and Gopal, 2005), and negative impact of human-tiger conflict include loss of human life and livelihood. CTR is the home of about 250 tigers having the highest density of tiger in the world. Hence, as the density of both humans and tiger are very high in the vicinity of the tiger reserve, reports of human tiger encounters are common and the incidence of straying tiger into surrounding habitation is a regular phenomenon. Based on the rescue and post-mortem operations conducted in the CTR and its territorial forest area, we can say that straying of tiger in CTR have increase sharply mainly due to territorial fights. Wounded and emaciated tigers generally come out from the jungle in search of easy prey and to save themselves from the other attacks. Wildlife health professionals face great challenges while managing wild patients and more importantly for animals that demands emergency attention. Wild animals may be presented in a variety of situations that require emergency interventions. These situations may arise during the animal capture, severe injuries, disease outbreak or natural disaster.

BRIEF HISTORY:

A tiger was spotted in Kotdwar road colony in Ramnagar adjacent to the boundary of the CTR at about 11:30 pm on 07/09/19. It created panic among the residents who gathered at the spot, creating ruckus in the area. On receiving the information, forest staff reached the spot and tried to drive the tiger towards the forest. But the tiger jumped into a drain to hide itself instead of running away towards the forest. Unfortunately, rescue of these animals usually attracts local people who are eager to see the capture and record it on their phones. The crowd became hysterical, people not only impeded the challenging operation but also put their own lives at risk. The presence of the crowd had greatly increased the stress levels of the tiger. Keeping human safety and tiger safety in mind it was decided to immobilize the tiger and remove it from that place. Immediately, permission was requested from the Chief Wildlife Warden to tranquillise the tiger. After obtaining the permission the tiger was immobilised and brought to CTR. It was released next day morning in the Jhirna Range of CTR.

RESCUE OPERATION:

The anaesthetic regime used in such emergencies is influenced by drug availability, budgetary limitations and administrative constraints. The modern repertoire of drug such as medetomidine, Zolazepam and atipamezole are not available in India, whereas Xylazine and Ketamine are readily available. The Xylazine and ketamine approach currently represents the sole practical option for immobilizing the tiger in emergency situations in India.

The tiger was darted in the hind leg using a Dan-Inject rifle with 5 ml dart. 180 mg of Xylazine hydrochloride and

300 mg of ketamine was used. The animal was darted at 1:58 am, and soon after the darting it became ataxic. The respiration was normal, and the tiger was in sternal recumbency. The induction time and first reaction time was noted. Induction time is the time from delivery of the immobilizing drug until recumbency, when the animal can be safely approached. The first reaction time is the time from complete immobilisation until the first sign of arousal, during which the animal can be safely handled. After 15 min. the tiger was silently approached. The head was secured and eyes were covered, and the tiger was transferred into the tiger cage. Soon after an i.v catheter was placed into the vein and Normal saline solution administered @10% of its total estimated body weight. A multi-vitamin injection along with Broad spectrum antibiotic injection were also administer parentally. Oxygen was supplemented @ 1 lpm. Vital signs including the heart rate, rectal temp. respiration rate and PO2 were monitored regularly after induction of immobilization until the first sign of recovery.

Table 1: Postinduction monitoring of the vital sign in immobilized tiger

	10 min.	20 min.	30 min.	40 min.
Rectal Temp. in Celsius	39.6	40	40	39
Respiration per min.	24	20	20	22
Heart rate (beats per min.)	58	55	55	50

Table 2: Correlating sign with dehydration

Variable assessed	Percent dehydration	Assessment
Dry mucous membrane	10-12%	Severe
Sunken eyes	10-12%	Severe
Skin turgor (Seconds to return to normal)	10-12%	5 seconds

Animal with dehydration level of 12% are generally under hypovolemic shock.

Table 3: Signs exhibited during the complete immobilization

Parameters	Signs exhibited by the tiger during the immobilization
Rectal temp.	Normal slightly
Respiration	Deep and slow
Heart rate	Irregular and arrhythmic
Palpebral reflex	No reflex
Gum	Pale

Condition of the Tiger: The tiger was severely wounded and emaciated. It was presumed that it had sustained multiple injuries after fighting with another tiger and we assumed that the wound resulted in its emaciated condition. There was evidence of myiasis in one hind leg and on the wither region, several maggots were removed and Antiseptic dressing was given.

After 40 min. reversal with Yohimbine @0.15 mg/ kg body weight was given i.m. This is a potent alpha-two adrenergic antagonist and has been used as an antagonist for Xylazine-induced sedation. Soon after the administration the respiration rate was increased significantly, and was short and shallow for a short period of time. The stages of yohimbine -induction recovery was as follow.

Stage of Yohimbine-induction recovery	Onset of arousal (Minutes)	Sternal recumbency	Full Recovery
Yohimbine @ 0.15 mg /kg b.wt	10 min.	25 min.	40 min.

Release: After full recovery, it was planned to release the tiger back into the jungle as it was hurting himself in the cage. 8 ml of dexamethasone injection was also given i.m before it released. At 8:00 am on 8/9/19 the tiger was released in the Jhirna zone of CTR. Slight opisthotonos curvature of spine was also noticed when it came out from the cage.

RECOMMENDATIONS:

Crowd Control and Management is an essential component of every successful rescue conducted in a populated area. Not only is it required for the safety of human beings, but further is essential for the safety of the animal. Unfortunately, rescue of these animals usually attracts local people who are eager to see the capture and record it on their phones. The presence of crowds greatly increases the stress levels of the animal, which could result in it feeling trapped and threatened causing it to attack the crowd and causing injury and even death. Further, the presence of crowds can hamper the Forest Department's attempts at a safe and successful rescue.

The area where the animal is sighted should immediately be cordoned off. This area should be at least 1 square kilometre from where the animal is sighted. This will not only reduce the chances of human injuries, but further assist the Forest Department in capturing the animal as chances of its moving because of disturbance will be greatly reduced. This can be done by setting up barricades by the Forest Department with assistance from the local police force as needed and available. Under no circumstances should private vehicles or people on foot be allowed in the area. For instance, a video taken by a resident of Ramnagar in the recent capture of a tiger from the town shows an individual jumping off a Gypsy that was in close proximity to the tiger and running away on foot. It also documents the amount of noise generated by the excited crowd. While fortunately the animal did not attack the person, such situations where the animal is frightened and is being hounded by vehicles could lead to disaster. Residents will certainly watch the animal, but from the safety of their homes. Further, the limited number of people will reduce the stress on the animal.

Such barricades may also be created with the assistance of the local Gypsy Drivers Association. A voluntary group can be created on WhatsApp where notifications of the animal's location can be sent. Gypsy Drivers, on a voluntary basis, can use their vehicles to create barricades. A condition of these barricades would be that no more than four people can be in one Gypsy, and no more than four Gypsies can be in one location.

Once the animal is successfully tranquilized and safely moved into a confined cage, local journalists may be invited in for a mini press conference with the Forest Department so they may disseminate news about the capture and rescue operation.

Access to the forest in all seasons is vital to animal capture and rescue operations. There are times where the Forest Department is called upon to rescue an animal from an area that doesn't have road connectivity throughout the year. For instances, rescue operations are greatly obstructed by road conditions in the monsoons that prevent the Forest Department Team from reaching the animal in a timely manner. The same applies for the release of the animal. Even if the animal is captured in an accessible area, its release should be in a deeply forested, remote location away from human habitation. Such locations are not easily accessible in all weather conditions. This results in increased time to take the animal to the release site, which enhances the stress to the animal and could potentially cause the animal to hurt itself. The following suggestions are given to help alleviate this issue:

1. *Maintaining Forest Roads* Throughout the Year: The Corbett landscape is dotted with streams that usually flood and render the roads unusable in the monsoons. The Rescue Team often spends a lot of time clearing a way through these and other such obstacles. If the forest roads are maintained, with special attention given to even small streams the rescue and release operations would be greatly improved. Drawback – high recurring cost in multiple locations; limited area that could be covered, especially for rescue.
2. *All Terrain Vehicle* to be given to the Forest Department, to be used exclusively for rescue and release of animals. Such a vehicle would allow the Rescue Team to reach the trapped animal faster, thereby reducing possible conflict between local populations and the animal and reducing the time of suffering of the animal in case of injury. This solution would also allow the Rescue Team to reach remote areas for rescues that are currently inaccessible by Gypsy. This would greatly enhance the ability and reduce time taken by the Rescue Team to get to the animal, tranquilize and move it into the vehicle, and release it. Drawback – high one-time cost.

Video Documentation of Rescues should be made where possible. The Rescue Team has identified various patrons of Corbett that are willing to assist with documenting rescues without any charge. These video documentations would help the Forest Department in the following ways.

1. It would allow the Rescue Team to revisit specific rescues with the intension of reviewing actions taken during the rescue. This will assist the Rescue Team in analysing the rescue, building upon best practices for rescues, and improving the success rate of future rescues.

2. A database of these videos can be easily maintained there by allowing future Rescue Teams to review them and learn from them, rather than learning only in the field.
3. In the event of unsuccessful rescues, the Forest Department can review the video footage to see and understand what went wrong, rather than having to rely just on hearsay.
4. These videos can be released to the public, resulting in increased transparency of the Forest Department's efforts and building public relations.

CONCLUSION:

This case report highlights a successful capture and removal of the conflicted tiger from the human dominated area by chemical capture method. The Veterinary Unit of CTR plays an important role in reducing human wildlife conflict by removing the conflicted or wounded wild animal from the conflicted site and thus, justifies their existence.