



Pattern of Mortality and Pathological Changes in Leopards (*Panthera pardus*) in Wayanad District, Kerala, India

M. Pradeep, Litty Mathew and N. Vijayan

Department of Veterinary Pathology, COVAS, Pookode, Wayanad, Kerala, India

Abstract: Knowledge of mortality factors is important for developing strategies to conserve the precious wildlife. For the present study, major pathologic findings and probable causes of death were determined by performing a complete necropsy of leopard carcasses received at Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, over a period of eight years (from January 1st 2006 to 31st December 2013). Out of six leopard carcasses received three were female and three males. Four cases (66.67%) were found to be died by poaching or poaching attempt. Poaching by gunshot (1 case), metal cable (1 case) and poaching attempt by trapping, resultant injury and toxemia (1 case) were observed. One death was due to signs of shock of unknown origin and one was due to pneumonia. Brain of the three carcasses was subjected to fluorescent antibody examination for rabies diagnosis which turned to be negative for rabies.

Key words: Leopard mortality, pathology, Kerala, antibody, pneumonia

INTRODUCTION

The leopard (*Panthera pardus*) is widely distributed on the Indian subcontinent and classified as Near Threatened by IUCN since 2008. The species may soon qualify for the Vulnerable status due to habitat loss and fragmentation, heavy poaching for the illegal trade of skins and body parts in Asia and persecution due to conflict situations. They are becoming increasingly rare outside protected areas. The trend of the population is decreasing (Henschel et al., 2008). The analysis of death in wild animals is very difficult to perform because most deaths go unobserved. Many of the carcasses were undergone autolysis or mutilated. Moreover, it is very difficult to know the exact cause of the mortality in free range wild animals from natural or unnatural factors. The unnatural factors include mainly two predisposing factors viz. Infectious and noninfectious diseases (Sinclair, 1977; Tompkins and Begon, 1999). As some diseases are readily transmitted from wild animals to humans, the interrelationship between wild animals, human beings and domestic animals has become very important in these days. For effective control and prevention of mortality in

free range wild animals, it is important to have knowledge on various conditions affecting the free range wild animals.

MATERIALS AND METHODS

The present study covers the major pathological changes of leopard carcasses (n = 6) bought for post-mortem examination to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, Wayanad over a period of eight years (from January 1st 2006 to 31st December 2013). Age of the animals was assessed using the method described by Stander (1997). Brain of three carcasses was subjected to fluorescent antibody examination for rabies diagnosis. The cause of death was determined based on gross pathological examination. After determining the probable cause of death, the death was categorized as death due to poaching, poaching attempt or other causes.

RESULTS AND DISCUSSION

Out of six leopard carcasses received for postmortem examination three were female and rest were male.

Corresponding Author: M. Pradeep, Department of Veterinary Pathology, COVAS, Pookode, Wayanad, Kerala, India

Table 1: Cause of death based on gross in leopards in Wayanad

Aprox. Age (year)	Sex	Major lesions present	Fluorescent antibody test for rabies	Cause of death
7	Male	Myocardial haemorrhage, acute pulmonary congestion and oedema	Not done	Shock
2	Female	Pulmonary haemorrhage, pneumonia	Not done	Shock
3	Female	Compression fracture of cranial and facial bones with dislocation of head. Compound fracture of bones of both the fore-limbs. Not done	Poaching	
4	Female	Killing by trap. A metal cable was present around the body	Negative	Poaching
2	Male	Bullet shot wounds with entry and exit points in the abdomen	Negative	Poaching
		Linear deep rupture in Liver with blood clots	Negative	Poaching
3	Male	Necrosis of paw and toxemia	Negative	Poaching attempt

Fig. 1: Death of leopard by poaching or poaching attempt

Details of the major pathological changes are noted in Table 1. Four cases (66.67%) were found to be died by poaching or poaching attempt. Poaching by gunshot (1 case), metal cable (1 case) and poaching attempt by trapping (Fig. 1), resulted in injury and toxemia (1 case) were observed. One death was due to signs of shock of unknown origin and one was due to pneumonia. Traumatic injury and resultant haemorrhagic or toxemic shock constituted 33.33% of all

the recorded causes of mortality. Kumar *et al.* (2012) studied the mortality in free range rescued wild animals and found that shock is one of the main causes of mortality. Usually, injuries were associated with vehicular trauma, inter and intra specific aggression, wire body grippers and foot traps by poachers and sometimes slippery terrains were found as a causation of these incidences. Fracture of femur, dislocation of vertebral column, injuries of thorax and abdomen and severe multiple wounds and complication of injuries were the most inflicting causes noticed in all animals (Kumar *et al.*, 2012). Similar lesion noticed in one carcass in the present study.

Infectious causes were not attributed to death in the present study. Earlier, it was believed that catastrophes

such as predation, migration, accidents, fire and pollution played a major role in threatening the wild animal population and diseases were not recognized as important factors in limiting the population. But now, diseases among the wild animals are recognized as important aspects in wild life conservation (Joshi, 2003). But, in wildlife, carcasses may not be accessible from the depth of the forest in all cases which may lead to the under reporting of infectious diseases.

Udawat *et al.* (2001) reported paralytic rabies in human following bite by leopard in India. So, screening of leopard carcasses for rabies is important. In the present study fluorescent antibody test for rabies diagnosis could be carried out only in brains of three leopard carcasses. The result was negative for rabies in all the three.

Young ones of age 2-3 years are mainly found to be poached in the study. This may be due to the frequent visit of the human habitat for preying domestic animals. Gastrointestinal parasites were present in small numbers in all carcasses that had an intact gastrointestinal tract but no deaths were attributed to parasites. Foreign materials like Metal pieces, ear tags of cattle etc have been recovered from two leopards.

The present study attribute to man animal conflict as major cause of leopard death. Leopard skin and bones do not have market in India. Poaching for leopard in Kerala is mainly due to the encroaching of human settlements to the forest land and resultant man wild animal conflict. Leopards are now considered the new urban foxes in India. According to Ministry of Environment and Forests, MEF (2011), man-animal conflicts are enhancing in various parts of the country. The greater amount of leopard death by poaching/poaching attempt indicate the urgent need of providing secured areas for wild animals like leopards and the wild animal habitats has to be secluded from human settlement. Once these elegant cats are lost, they cannot be brought back.

CONCLUSION

A definitive cause of death was determined for 83.33% of the submitted cases. Although, the absence of

consistent use of toxicological analysis and contaminant testing decreases the conclusiveness of the findings, this study has broad implications in establishing baseline data on causes of death of wildlife population in Wayanad District for future studies and for the detection of emerging diseases.

REFERENCES

- Henschel, P., L. Hunter, U. Breitenmoser, N. Purchase and C. Packer *et al.*, 2008. *Panthera pardus*. IUCN Red List of Threatened Species. Version 2011.2. International Union for Conservation of Nature. <http://www.iucnredlist.org/details/15954/0>.
- Joshi, B.P., 2003. Wildlife Health Management in India. In: *Wildlife and Disease in India*, Sharma, B.D. (Ed.), Asiatic Publishing House Distributors, New Delhi.
- Kumar, V., V. Kumar and A. Raj, 2012. Mortality in free range rescued wild animals of Shivalik Hills of Himachal Pradesh, India. *Vet. Sci. Dev.*, 2: 4-6.
- MEF., 2011. Man-animal conflicts in India. Ministry of Environment and Forests, Government of India, September 23, 2011. <http://pib.nic.in/newsite/erelease.aspx?relid=76176>.
- Sinclair, A.R., 1977. *The African Buffalo: A Study of Resource Limitation of Populations*. 1st Edn., University of Chicago Press, Chicago.
- Stander, P.E., 1997. Field age determination of leopards by tooth wear. *Afr. J. Ecol.*, 35: 156-161.
- Tompkins, D.M. and M. Begon, 1999. Parasites can regulate wildlife populations. *Parasitol. Today*, 15: 311-313.
- Udawat H., N. Bansal and R.K. Goyal, 2001. Paralytic rabies following leopard bite. *J. Assoc. Physicians India*, 49: 773-774.