

Neurological Disorders in Wildlife Conservation: Challenges and Interventions

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SUMMARY

Neurological disorders in wildlife pose significant challenges to conservation efforts globally, affecting species viability and ecosystem health. In India, renowned for its biodiversity, these challenges are particularly acute due to diverse habitats and numerous endemic species. This article explores the prevalence, diagnosis, management, and conservation implications of neurological disorders in Indian wildlife. By examining current research, and conservation strategies, this article aims to provide foundational knowledge essential for wildlife conservation in India's dynamic and biologically diverse environment.

INTRODUCTION

India is one of the most important biodiversity hotspots for Wildlife in the World. India harbours biodiversity in the form of 6% mammals, 6.2% reptiles and 12.6% avian species, according to a study [1]. Taking into account this rich biodiversity, efforts must be taken for its conservation. Wildlife conservation presents various challenges namely poaching, climate change and anthropogenic activities. Another factor that influences conservation is the health of wild animals. Neurological disorders in Wildlife, ranging from trauma to infectious diseases, threaten the survival and well-being of these species and have an impact on India's biodiversity. Neurological diseases in wildlife vary in accordance with species. For instance, Tiger communities in India have shown outbreaks of Canine Distemper Virus (CDV): CDV in India, causing neurological symptoms among other signs (Singh et al). Similar to Tigers, striped hyenas in India are also susceptible to Canine distemper virus. In Cheetah neurologic diseases like cheetah ataxia are prevalent along with feline spongiform encephalopathy, leukoencephalopathy among others. In Elephants, Endotheliotropic Herpesvirus (EEHV) is a viral disease affecting young elephants, causing haemorrhagic disease and neurological symptoms (Zachariah et al). In bats Nipah Virus Encephalitis is a zoonotic virus affecting fruit bats, causing severe encephalitis in both bats and humans (Arankalle et al). Nervous system adaptations are a key component of Wildlife neurology. Such adaptations are a reflection of their evolutionary history. They form the basis of their ecological role and thereby their conservation. It is seen extensively from the Indian elephant to the smaller Indian Wild dog (Dhole). Elephants (*Elephas maximus indicus*) make use of highly developed neural pathways for intricate survival in varied habitats.(Fowler and Mikota, 2008). On the other hand, Indian wild dog (*Cuon alpinus*) rely on acute sensory perception and coordinated hunting strategies facilitated by specialized neurological adaptations (Ranawana and Santiapillai, 2002). Hence understanding these adaptations aids in diagnosing and managing neurological disorders specific to these species in India.

Neurological disorders can stem from various different factors.

Environmental factors may range from trauma to Infectious diseases like rabies and canine distemper. Habitat fragmentation may exacerbate metabolic disorders which in turn causes neurological disorders. Humanitarian activities can also be the reason for manifestation of various Neurological disorders. For instance pesticide-induced neurological impairments in vultures (*Gyps indicus*) have led to catastrophic declines in their populations across India, impacting ecosystem health and scavenger dynamics (Shultz et al., 2004). Similarly, traumatic brain injuries from human activities, such as railway accidents involving elephants, pose critical threats to their neurological health and long-term survival (Fernando et al., 2008).

Diagnostic approaches for Neurological disorders in wildlife are of various types.

The approach differs markedly from domestic animals due to species specific behaviours, territorial behaviour, limited accessibility and general lack of knowledge and research. A Comprehensive approach includes combination of clinical observations, field diagnostics, and emerging imaging technologies, including thermal imaging and drone-based surveys. This aids in non-invasive diagnosis (Sil et al., 2018). Non-invasive and

accurate early diagnosis aids timely intervention and thereby conservation. Hence various diagnostic approaches optimize conservation outcomes for affected wildlife.

Conservation strategies are employed to mitigate neurological disorders in Indian wildlife.

Conservation of wildlife is important to maintain biodiversity and ecological balance. Wildlife rehabilitation centres across India, such as the Wildlife SOS Elephant Hospital in Mathura, provide critical care and rehabilitation for injured elephants and other wildlife with neurological impairments (Jayewardene et al., 2015). Educational initiatives and public awareness campaigns raise awareness about wildlife health, promoting coexistence and reducing human-wildlife conflicts. The efficacy of conservational strategies can be measured by highlighting the resilience of Indian wildlife and is a collective effort. For example, Diclofenac is a veterinary drug toxic to scavenging birds. It is administered to cattle which are further passed on to scavengers like vultures. The recovery of vulture populations following the ban on Diclofenac shows impact of policy interventions on mitigating neurological disorders in wildlife (Shultz et al., 2004). Collaborative approach is the prime way to address these issues. Wildlife biologists, veterinarians, and local communities have also yielded innovative solutions to reduce human-induced injuries and enhance conservation outcomes for species like elephants and big cats (Fernando et al., 2008). Hence conservational strategies may only be effective through an interdisciplinary approach.

CONCLUSION

Neurological disorders pose significant challenges to wildlife conservation efforts in India, but through integrated veterinary management and conservation strategies, these challenges can be effectively addressed. By advancing our understanding of wildlife neurology and implementing evidence-based interventions, veterinarians and conservationists can safeguard India's diverse wildlife species for future generations. Through collaborative research, community engagement, and proactive conservation measures, India can uphold its commitment to preserving its natural heritage and biodiversity.

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