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Case Report

A Case Report of Rabies in a Striped Hyena *(Hyaena hyaena)* in Fars Province of Iran

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Abstract: Rabies is an infectious, highly fatal and true zoonotic disease. Disease remains endemic and a major public health problem in Iran. In this article, we describe a case report of rabies in a Striped Hyena *(Hyaena hyaena)* in Iran. One Striped Hyena was found in Fars Province Near human communities in a landfill site. Clinical signs were characterized by severe states of depression, blindness, ataxia, anorexia, lethargy and tenesmus. Due to clinical signs and suspected rabies, the animal was euthanized. The brain samples were taken from the Hyena and transported fresh on ice to the laboratory of Pasteur Institute of Iran. Fluorescent antibody technique (FAT) confirmed rabies infection in the Striped Hyena.

Keywords: *: Carnivores, Hyaena hyaena, Iran, Rabies, Striped Hyena*

İran'ın Fars Eyaletinde Çizgili Bir Sırtlanda *(Hyaena hyaena)* Kuduz Olgusu

Öz: Kuduz, bulaşıcı ve son derece ölümcül gerçek bir zoonotik hastalıktır. Hastalık, İran'da endemik ve önemli bir halk sağlığı sorunu olmaya devam etmektedir. Bu çalışmada, İran'da bir çizgili sırtlanda *(Hyaena hyaena)* kuduz vakası ele alınmıştır. Fars Eyaletinde bir çöplük alanında insan topluluklarının yakınında bir adet çizgili sırtlan bulundu. Klinik bulgular şiddetli depresyon, körlük, ataksi, anoreksi, uyuşukluk ve tenesmus ile karakterizeydi. Klinik belirtiler ve kuduz şüphesi nedeniyle hayvana ötenazi uygulandı. Sırtlandan alınan beyin örnekleri buz eşliğinde taze olarak İran Pasteur Enstitüsü laboratuvarına nakledildi. Floresan antikor tekniği (FAT), çizgili sırtlanda kuduz enfeksiyonunu doğruladı.

Anahtar sözcükler: *Karnivorlar, Hyaena hyaena, İran, Kuduz, Çizgili sırtlan*

Introduction

Rabies is one of the oldest known infectious diseases in the world for warm-blooded vertebrates and is caused by viruses in the genus Lyssavirus, family Rhabdoviridae [1]. Experimentally, all warm-blooded vertebrates are prone to rabies, but only mammals are important in the epidemiology of the disease [2]. The causative agent is a neurotropic virus that is primarily replaced and replicated in the central nervous system (CNS) and then transmitted to the saliva and salivary glands. The disease is most often transmitted through the bite of infected animals.

From an epidemiological point of view, two cycles (Urban and Wildlife/Sylvatic cycle) are considered for rabies. In rabies, the term reservoir specifically refers to those species that preserve the disease in the wild [2,3]. Dogs are the main reservoir in the rabies urban cycle in Asia. Wild carnivores are considered a reservoir of rabies in the wildlife cycle. The wildlife cycle usually creates an urban cycle due to frequent contact between wild carnivores and stray dogs [3].

Transmission of rabies virus in animals is almost always the result of the bite of an infected animal [4]. Most dogs and cats become infected through contact with wildlife reservoirs (raccoons, foxes, bats, etc.) [5]. With a few exceptions, the bite of an infected animal is the only route of transmission of rabies in all known cases in humans too. Although rabies is endemic in the wildlife of Iran,

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where infection of domestic livestock is frequent, trying to eradicate urban cycle of the rabies is one of the most important priorities of Iran Veterinary Organization.

In the present paper, described a case report of rabies in a Striped hyena that had seen by locals near one of the cities of Fars province.

Case History

On December 10, 2020, at a landfill site 30 km from the city of Dariun, a Striped hyena with the initial signs of weakness and lethargy was Chemical Immobilized by me as a Collaborator veterinarian of Fars Province Environment Organization and a team of rangers Fars Province. The hyena was seen by locals at the landfill site for several days, but there were no reports of attacks on humans or other animals *(Fig. 1-A,B)*.

The hyena was transferred to wildlife rehabilitation center in Bamou National Park. The Striped hyena was male and adult. Clinical examination and observation of behaviors was performed for five days. During these five days, the animal was anesthetized three times with the ketamine (2.5 mg/kg) + medetomidine (0.04 mg/kg) protocol and clinical examination was performed undergo anesthesia. In behavioral observations reclusive and severe states of depression were detectable. In addition to this, the most obvious clinical sign was blindness. Inability to pass Maze test and see objects, absence of PLR Reflex, Menace Response and Dazzle Reflex was detected during behavioral observation and clinical examination. Ataxia as swaying, Anorexia, lethargy and tenesmus was another clinical signs of this Striped hyena. The Striped hyena did not respond to stimuli, had states of depression and was blindness *(Fig. 2)*. Due to clinical signs and suspected rabies, the animal was euthanized with a high dose of sodium thiopental after five days.

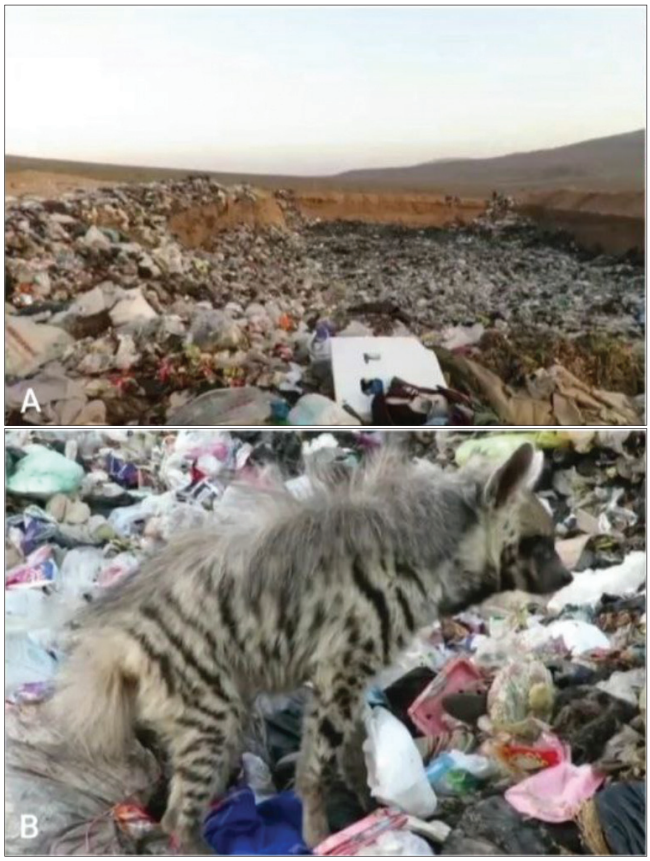

Fig 1. The place where the Striped hyena was seen. A- The landfill site, B- Striped hyena among the garbage

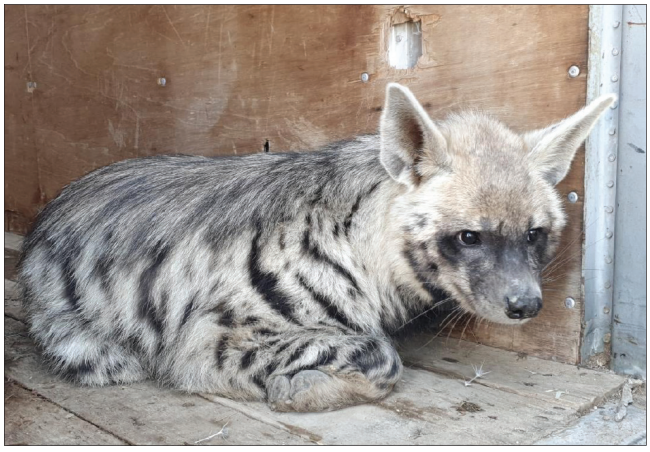

Fig 2. Blind striped hyena, with states of depression and no response to stimuli

The brain samples were taken from the Hyena soon after death. The sample was refrigerated and transported fresh on ice to the laboratory of Pasteur Institute of Iran. Impressions of tissue samples from the brain stem, hypothalamus and the hippocampus were examined for rabies infection using Fluorescent Antibody Test (FAT). After three weeks, the results of rabies samples were positive.

Discussion

Rabies is an acute encephalomyelitis of mammals. It is endemic in Iran and has been reported in most provinces. Rabies is the most important zoonotic disease in the country [6]. Although all wild carnivores are considered a reservoir of rabies in the wildlife cycle, reservoirs of rabies vary from region to region. In one study it was reported that in different northern areas of Iran exhibit that dog, fox and jackal are the most common reservoirs of the disease and also wolves as the predominant ones in western parts [7]. On the other hand, in compared to foxes, jackals and wolves, there are fewer reports of rabies in hyenas. In another study, it was reported that although 37% of Serengeti hyenas were exposed to rabies, infection occurred in only 13% of animals, indicating that many animals eliminated the virus from their body after exposure [8].

The most obvious clinical sign of this disease is an acute state of behavioral changes. As a general rule, "the atypicality" is typical sign of rabies [2]. The disease can have a wide range of clinical symptoms, making it difficult to distinguish it from other acute progressive encephalomyelitis syndromes. Because of its public health significance, rabies should be on the list of differential diagnoses considered in every animal with rapidly progressing neurologic dysfunction [9].

In conclusion, all wild carnivores are considered a reservoir of rabies in the wildlife cycle and the disease can have a wide range of clinical symptoms and on the other hand due to frequent contact between wild carnivores and stray dogs the urban cycle of the disease occurs. Therefore, rabies should take precedence over other diagnoses in any wild animal with rapidly developing neurological dysfunction in endemic area like Iran. Furthermore, principled management of human waste, managing the stray dog population as a disease reservoir in the urban cycle to prevent disease transmission to humans, reduce costs of post exposure prophylaxis and efforts to eradicate the urban cycle of disease are essential.

Availability of Data and Materials

The author has provided the required data availability statement, and if applicable, included functional and accurate links to said data therein.

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Competing Interests

The authors declare that there is no conflict of interest

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Author Contributions

ES: Investigator, manuscript preparation and sampling, FK: Sampling and data recording

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