

Wildlife and zoonosis in Rio de Janeiro - A Tourist Health Risk

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Abstract

*Environmental changes and ecological disturbances have resulted in wildlife's intense urbanisation. Zoonotic diseases causes 2.2 million deaths annually in the world. They represent 60% of human infectious diseases. This study highlights potential risks for infectious diseases transmitted by wild animals in Rio de Janeiro, Brazil. Marmosets (*Callithrix* sp.) and capybaras (*Hydrochoerus hydrochaeris*) frequent different areas of Rio. and are reservoirs of various zoonosis, including rabies. Accidents involving monkeys may occur in public parks due to the public offering food. People are unaware that monkeys are also transmitters of the disease and do not seek medical care after being bitten.*

*Capybaras are found in Lagoa de Freitas. The species is a natural host for the *Amblyomma cajennense*, the main reservoir of *Rickettsia rickettsii*, the cause of Brazilian spotted fever (BSF). Sporadic cases of BSF have been confirmed in Rio and BSF should be considered in the differential diagnosis of dengue also endemic in Rio.*

Zoonotic infections related to wildlife may occur in big cities and health care providers should be able to recognize and to manage them. People should resist the temptation to approach animals and to maintain maximum distances from them at all times.

Introduction

Environmental changes and ecological disturbances caused by natural phenomena or human intervention result in intense urbanisation of wildlife and are important factors in emergence and reemergence of diseases. Causal factors associated with this vulnerability and facilitate the transmission of infectious agents include: population growth and consequent human migration, introduction of animals into new habitats or their absence, changes in the distribution of hosts and vectors, and increased interaction between humans and the wildlife¹. In an interconnected world that is undergoing considerable climate and environmental change, human, animal and environmental health is inextricably linked. Zoonotic diseases, which can be transmitted from domestic and wild animals to humans as well as from humans to animals, cause 2.2 million deaths and 2.4 billion cases of human illness every year in the world. They represent 60% of human infectious diseases and 75% of emerging diseases².

Rio de Janeiro is the second largest city in Brazil and its population is about 6,000,000 people. Although Rio is a city located in the tropics, tropical diseases are not a major problem there, except for dengue. In 2008, there were >120,000 dengue cases and 157 related deaths. Leishmaniasis (<100

cases/year) transmission occurs in rural areas. Accidents involving Bohtrops snakes may happen during ecotouristic activities. There is no malaria transmission³.

The city of Rio de Janeiro occupies an area of 1,182.3 square kilometers and it has about 35,290 ha of forests and other natural environments, i.e., 28.9% of municipal territory. The largest fragments of native vegetation are found in the Tijuca Massif, Pedra Branca Massif and Gericinó-Mendanha Massif. The rest is spread out on isolated hills and wetlands. Although Rio de Janeiro has a percentage of forest cover above the average among of other capitals located in the Atlantic Forest biome, its dense urban fabric resulted in the formation of isolated forest fragments into various "islands"⁴.

It is the presence of wild animals in urban areas is frequently reported in Rio and they can be easily seen even in touristic places. As specialist in Infectious and Parasitic Diseases living in Rio de Janeiro I noted that some animals observed in these areas could be source of zoonosis for people.

The aim of this paper is to highlight the potential risks for infectious diseases transmitted by wild animals (especially marmosets and capybaras) in urban areas of Rio de Janeiro.

Marmosets

Marmosets (*Callithrix* sp.) can be seen often, from the ground to the top of trees, round Sugar Loaf Mountain. *Callithrix penicillata* and *Callithrix jacchus* were introduced as pets in Rio in 1980's and the population of marmosets is growing.

Human food, cultivated plants and garbage, can become part of monkeys' diet and affect activity patterns. Urbanisation and deforestation has



enhanced opportunities for contact between humans and monkeys and aggressive interactions are becoming common. Non-human primates such as marmosets are reservoirs of various zoonosis,

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including rabies. Rabies is a zoonotic disease caused by ribonucleic acid (RNA) viruses in the Family Rhabdoviridae, Genus Lyssavirus. Rabies is transmitted by infected animal bites or scratches, or by contamination of abrasions, open wounds, or mucous membranes by infectious material (almost always saliva). From 1980–2009, Brazil reported 198 human cases of rabies transmitted by wild animals, 20 cases by monkeys.

Nonhuman primates are the third most common transmitters of rabies to humans, after carnivores (dogs and cats) and bats. Accidents involving monkeys may occur in public parks due to contact during food offering, in residential areas near forests, and by captive monkeys kept as pets.⁵ People are unaware that bats, foxes, monkeys and other wild animals are also transmitters of the disease. So, they do not seek medical care after being bitten by these animals and thus are at serious risk of being infected. In March

Case History

In 2012, one 9-year-old boy diagnosed with human rabies died in Ceará State, Brazil. He was bitten by a marmoset while playing with the animal. The boy did not receive timely post-exposure treatment, and was admitted to hospital when clinical symptoms were well advanced⁶.

The virus is still present in Rio as a study showed that 11 (5.6%) of non-hematophagous bats from Rio de Janeiro City were positive for rabies⁷.

Recommendation: After any potentially rabid animal exposure, immediate washing and flushing of the wound with soap and water is imperative. Rabies vaccine should be given as soon as possible after any contact with a monkey that is not captured and examined for rabies⁸.

Capybaras

Capybaras (*Hydrochoerus hydrochaeris*) can be easily spotted in a lagoon located in Rio city. The species is a host for the “star tick” (*Amblyomma cajennense*), the main reservoir of *Rickettsia rickettsii*, cause of Brazilian spotted fever (BSF). Sporadic cases of BSF have been confirmed in Rio⁹.

Case history

A 20-year-old student died on February 2014 of BSF in Minas Gerais State. The man showed symptoms of high fever and body aches a little more than 10 days after riding a bicycle by the edge of a lake in the Pampulha region. The student died after spending 5 days in the hospital. Doctors initially believed the student had dengue based on his symptoms. A test performed later confirmed that he had BSF. The suspicion is that capybara in the Pampulha region were the reservoir for the tick and the rickettsia.

Early recognition of this disease is important in

minimizing morbidity and mortality. This is especially true in areas where the infection is not widely reported. The incubation period of the disease is about a week after the tick exposure, long after the tick has detached. The presenting illness is generally nonspecific, fever, muscle pains, headache (the headache is usually described as quite severe). The rash begins in day 3 of illness, initially maculopapular at the wrists and ankles before becoming petechial and purpuric involving the palms and soles, as well as spreading proximally to the trunk. Purpura usually is



Capybaras

not seen before the 6th day of illness. Mortality is indeed quite low if treatment (usually a tetracycline) is begun during the 1st 2 days of the rash or before. Empiric treatment for this infection should always be begun in people with compatible symptoms inhabiting endemic areas, even if no tick bite is known. Risk of infection is no longer restricted to rural, peri-urban and wild areas, but is associated increasingly the transmission in urban areas (public parks, for example). Capybara populations in urban areas are associated with high environmental infestation of ticks and the increased risk of bites and of pathogen transmission to humans¹⁰. BSF should always be considered in the differential diagnosis of dengue.

Recommendations: Only a minority of arthropod borne diseases (ABDs) have preventive vaccines, chemoprophylactic drugs, or specific therapies. Even if available, they are not totally effective, making measures to minimize arthropod bites an important way to reduce the risk of acquiring ABDs. Several personal protective measures reduce the risk of acquiring ABDs, but no single measure provides complete protection. The use of all measures is complementary. Everybody at risk of exposure to serious arthropod-borne infections should appropriately use insect repellent containing DEET (the preferred repellent, unless contraindicated due to allergic reaction). Icaridin (Picaridin) and

P-menthane-3, 8-diol (lemon eucalyptus oil) may be used as a second-line alternative repellent. Combining DEET and permethrin-impregnated clothing enhances protection against biting arthropods. If an attached tick is found, it should be removed by grasping with tweezers or fine-tipped forceps close to the skin and gently pulling with constant pressure. Gasoline, kerosene, petroleum jelly, fingernail polish, or lit matches—should never be used to extract ticks. Removing the tick with bare hands should be avoided because fluids containing infectious organisms might be present in the tick's body and at the wound site. Ticks that have been removed should not be crushed between the fingers to prevent contamination, and hands should be washed to avoid potential conjunctival inoculation. The bite wound should then be disinfected¹¹.

Conclusions

Zoonotic infections related to wildlife may occur in big cities and health care providers should be able to recognize and to manage them. People should resist the temptation to approach animals and to maintain minimum distances from them at all times.

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