Title: Rabies in a stray dog - A case report

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Keywords Direct Fluorescent Antibody Technique (dFAT), Diazepam, Sylvatic, Rabies virus (RABV), Golden Jackals (Canis aureus), spillover.

Abstract

India accounts for 30 per cent of canine-mediated rabies burden globally. In the present case, a stray/free roaming dog with nervous signs was reported from the campus of CVSc, AAU, Khanapara, Guwahati – 781 022. The animal was sedated at the site of pick up and admitted to the inpatient unit of Veterinary Clinical Complex of the college. The dog died two days post admission. Brain sample was collected at post-mortem by occipital foramen approach and submitted to the OIE Reference Lab for detection of rabies. It was confirmed as positive for rabies by LFA, dFAT and dRIT.

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CASE REPORT

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Abstract

India accounts for 30 per cent of canine-mediated rabies burden globally. In the present case, a stray/free roaming dog with nervous signs was reported from the campus of CVSc, AAU, Khanapara, Guwahati – 781 022. The animal was sedated at the site of pick up and admitted to the inpatient unit of Veterinary Clinical Complex of the college. The dog died two days post-admission. Brain sample was collected at post-mortem by occipital foramen approach and submitted to the OIE Reference Lab for detection of rabies. It was confirmed as positive for rabies by LFA, dFAT and dRIT.

Key words: direct Fluorescent Antibody Technique (dFAT), Diazepam, Sylvatic, Rabies virus (RABV), Golden Jackals (Canis aureus), spillover.

Introduction

Rabies is a fatal zoonosis caused by genus *Lyssavirus* under *Rhabdoviridae* family. Dogs are the predominant reservoir of rabies virus in India, though evidence of rabies virus neutralizing antibodies has been reported in bats from Nagaland, India (Mani *et al*., 2017). Epidemiological studies showed that many wildlife species besides dogs are responsible for transmitting rabies to both human and livestock (CDC, 2007). The rabies virus circulates in terrestrial and airborne mammals with two epidemiological cycles, which are interrelated i.e. urban and sylvatic cycles. The urban cycles involves mainly pet dogs and cats while the sylvatic cycle involves wild mammals like badger, bandicoot, bat, bobcat, coyote, fox, jackal, mongoose, monkey, lion, raccoon, skunk and wolf, etc. as vectors/reservoirs (Menezes, 2008; Kuzmin *et al*., 2012). In India, dogs and jackals are the major vectors or reservoirs (Gongal and Wright, 2011).

Case history

On October 26, 2019, a stray dog/free roaming dog (FRD) aged about two years was found with nervous signs in the campus of College of Veterinary Science, Assam Agricultural University Khanapara, Guwahati – 781 022 (26.1213° N - 91.8208° E). Clinical manifestations noted were salivation, trismus, inability to walk due to paresis of hind limbs and lethargy due to anorexia.The animal was found soaked in rain lying by an abandoned building with clinical signs suggestive of CNS involvement. The campus is located adjoining Amchang Wildlife Sanctuary, Assam (26°07'18.4"N - 91°49'17.5"E), which is a habitat of various wildlife including golden jackals (Canis aureus). The FRDs chasing jackals are frequently sighted in the locations of the campus bordering the forested area.

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Materials & Methods

Based on the clinical signs, the dog was suspected for rabies and was translocated to the In-patient unit of the Veterinary Clinical Complex of the college after sedation with diazepam @ 0.5–1mg/kg BW intramuscularly. After continuous observation for two days, the dog died. The brain tissue was collected by foramen magnum approach (Ghouse *et al.* 2020) and shipped to the KVAFSU-CVA Rabies Diagnostic Laboratory, OIE Reference Laboratory for Rabies, Department of Veterinary Microbiology, Veterinary College, KVAFSU, Hebbal, Bengaluru-560 024, Karnataka, for laboratory confirmation. The carcass was disposed of by deep burial method.

Results & Discussion

For confirming the presence of rabies virus, the brain sample was subjected to Rapid Test Kit (Anigen Rapid Rabies Ag Test kit, Bionote, South Korea), direct Fluorescent Antibody Technique (dFAT) and direct Rapid Immuno-histo-chemical Test (dRIT). The sample tested positive to all the three tests.

History of dog-bite in the present case could not be ascertained as it was a free-roaming dog. Since, the dog was confirmed positive for rabies, it was hypothesized that the dog had either encountered other rabid stray dog/ FRD or wildlife as the campus was adjacent to the wildlife sanctuary. From the epidemiology point of view, mortality due to rabies in the present case was correlated with the overlapping of sylvatic and urban rabies. The college campus being adjacent to a vast forest area and vegetation inside the campus provided favourable habitat for wildlife including golden jackals (*Canis aureus*) and other mesocarnivoes, it could be inferred that the dog might have been exposed to sylvatic reservoirs like jackals and developed rabies.

In India, jackals are reported as animals that incidentally bite people who seek PEP (Menezes, 2008). They are mostly found closer to the human habitats for easy access to food sources in the absence of competition from megacarnivores (Anon, 2018; Singh, 2020). Although dogs are the main host and transmitter of rabies in urban settings, side-striped jackals (*Canis adustus*) are endemic species in Zimbabwe which spread rabies to domestic dogs (Swanepoel et al., 1993). Besides dogs, black-backed (*Canis mesomelas*) and side-striped jackals (Canis adustus), bat-eared foxes and mongooses are included in RABV reservoirs, with occasional spillovers into other species (Nel et al., 1997). Zulu et al. (2009) reported relation between domestic dogs and black-backed jackals from northern South Africa, stating that black-backed jackals (*Canis mesomelas*) are capable of sustaining rabies cycles independently of domestic dogs. Munang'andu et al. (2011) mentioned that side-striped jackal (*Canis adustus*) is the predominant animal species in wildlife tested for the presence of rabies virus. Bellan et al. (2012) reported that jackal RABV is a part of the transmission cycle of dog-jackal RABV cycles in Namibia. On phenotypic analysis of 20 brain samples from different wildlife in India, Reddy et al. (2019) observed that all of the rabies virus isolates belonged to classical genotype 1 of *Lyssavirus* and were closely related to Arctic/Arctic-like single cluster indicating the possibility of a spillover of rabies among different species. Wild animals are suspected to be reservoirs of animal viruses like rabies, leading to spread of the disease to the animals in the adjoining forest areas, albeit reports of confirmed rabies cases are few (Daly *et al.* 2014).

Conclusion

The present case of rabies in a stray dog /FRD rescued from a shared dog-jackal habitat was adjoining a vast forest area. Obviously, besides dog-jackal conflicts other epidemiological determinants were involved in the phenomenon of sylvatic reservoirs overlapping the urban rabies cycles that favoured transmission / spillover of rabies. Further investigations for canidae-associated geno/biotype of RABV will establish the role of wild canidae (mesocarnivore) vis-à-vis rabies in stray dogs/FRDs mostly found as scavengers in campus or residential areas.

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