

THE SIGNIFICANCE OF IXODIDA TICKS IN THE SPREAD OF INFECTIOUS DISEASES

N.A. Yarmukhammedova

N.S. Yakubova

Samarkand State Medical Institute, Samarkand, Uzbekistan

INTRODUCTION

As a consequence of climate change, the spread of tick species and associate pathogens pose an increasing public health threat in Uzbekistan like in many countries. Due to the difficulty of clinical and laboratory diagnostics and only sparse records on the distribution of tick-borne infections, among them tick-borne rickettsioses (TBR), are underreported.

METHOD

Between 2021-2023, we collected 20,000 adult tick specimen in Tashkent, Syrdarya, Jizzak and Samarkand regions in Eastern Uzbekistan. Ticks were collected by flagging and picking from domestic animals. Collection was carried out at multiple time points in 13 wild as well as 9 domestic biotopes. In total, 599 farm animals were examined. Ticks were identified and pooled by species. Collected specimen were tested for *Rickettsia* spp. by PCR. All positive samples were sequenced. The nucleotide sequences were deposited in the NCBI GenBank database. Medical histories (inpatient card) of the infectious regional clinical hospital of the city of Samarkand were analyzed and 31 medical histories were compiled of patients with fever for 5 or more days, which were used for clinical and laboratory studies.

Results: Across all sampled sites, we identified 14 different tick species; 13 from Ixodidae family (*Dermacentor marginatus*, *Haemaphysalis concinna*, *H. sulcata*, *Hyalomma anatolicum*, *H. asiaticum*, *H. impressum*, *H. scupense*, *Rhipicephalus annulatus*, *R. bursa*, *R. pumilio*, *R. rossicus*, *R. sanguineus*, *R. turanicus*) and one from Argasidae family (*Argas persicus*). The infestation rates of collected ticks with *Rickettsia* spp. was 25.2 % in Jizzak region; 24.1% in Samarkand region; 14.0 % in Tashkent region and 0.72 % in Syrdarya region. Among the *Rickettsia*-positive samples, 6 counts of *R. barbariae* were found in 4 tick species in Jizzak as well as Samarkand region. Furthermore, *R. massiliae* and *R. sibirica* were found in *H. scupense* in Samarkand region. None of these species had been previously reported in Uzbekistan. In this study, for the first time we detected *R. barbariae*, *R. sibirica* and *R. massiliae* strains from ticks collected in Eastern Uzbekistan. The examined strains of *R. sibirica* and *R. barbariae* showed highest similarity with strains from the surrounding countries China and Iran. Whereas, *R. massiliae* clustered with a sequence from France. These findings underline the importance of surveillance to monitor the natural spread of pathogens as well as dissemination via travel. When examining 31 patients, it was noted

that in 83.9% (26) of cases there was an acute onset of the disease with fever and symptoms of intoxication (headache, weakness, malaise, decreased or lack of appetite, and others). And only 16.1% (5) of patients had prodromal phenomena in the form of low-grade fever, chills, general weakness, pain in muscles and joints, deterioration of sleep and appetite, lasting 1-2 days. According to our observations, in 35.4% (11 patients) of cases, the primary affect arose in the form of a focus in the form of an area of necrosis (ulcer) measuring 0.2-1.5 cm, surrounded by an infiltrate with an area of hyperemia at the edges. The inflammatory infiltrate surrounding the focus of necrosis reached sizes from 0.5 to 2.0 cm, the surrounding zone of skin hyperemia ranged from 0.5 to 8-10 cm in diameter. A characteristic and symptom of rickettsiosis was exanthema, which was noted in half of the patients with consequences for R. Type 51.6% (16 patients). The elements of the mounds were located on an unchanged skin background, ranging in size from 1-4 mm to 1.5 cm in diameter, were not prone to merging and were not accompanied by examination.

CONCLUSION

In a phylogenetic comparison with sequences from NCBI GenBank, the obtained sequences from *R. barbariae* and *R. sibirica* clustered with sequences from China and Iran. The *R. massiliae* sequence showed closest similarity to a sequence from France. At the beginning of observation, the patient had an acute illness with fever and symptoms of intoxication, the primary affect manifested itself in the form of foci in the form of an area of necrosis (ulcer) measuring 0.2-1.5 cm, surrounded by an infiltrate with hyperemia at the edges.