CASE REPORT

Simultaneous Q fever and West Nile Virus Infection: Occupational Disease?

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INTRODUCTION

The simultaneous Q fever and West Nile Virus infection disease of N. N. (29 year old male), a turkey farm employee was reported by a specialist of the infectious diseases outpatient clinic to the competent regional Government Office Labour Inspectorate on 14th November 2014 as an occupational disease.

THE CASE

Work history

N. N. carried out lawn mowing activities as a landscaper at the turkey farm of an agricultural company between 3rd April and 30th October 2014, equipped with proper protective equipment, using a closed cabin lawn tractor as well as with a gasoline-powered lawn mower. He used the mosquito and insect repellent as well as proper safety equipment provided by his employer. He had no direct contact with the animals and their manure.

He received FSME vaccination (against tick-borne encephalitis) on 15th May 2014 and 24th June 2014. He underwent fitness for job examination upon hiring and was found to be fit. He did not detect any tick bite in the previous year nor could he remember any mosquito bites. Previously – until mid-August – he participated in several bike races in various parts of the country but could not recall getting bitten by any mosquitos during those times, either.

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History of the current disease

At the end of August 2014 N.N. went to his General Practitioner complaining of a fever and headache. His symptoms did not improve after two weeks despite taking a fever and pain reliever so on 11th September 2014 he was referred to the department of infectious diseases with headache localized to the frontal and occipital region, fever and dry cough.

Laboratory, radiology, neurology and ophthalmology examinations raised the suspicion of Q fever so a blood sample was sent for serological testing. At the same time, he received Doxycycline therapy. He was released to go home on 15th September after becoming fever and symptom free. He arrived for a check-up and to discuss the serology results on 22nd September. His dry cough persisted, he complained of a headache in his forehead region in the evening hours in the previous 2 days.

Based on the serology result received the patient had acute or recent Coxiella burnetii (Q fever) infection as well as current West Nile virus (West Nile fever) infection, this latter raised the tick-borne encephalitis antibody level from the previously received vaccination. His serology results in the direction of lymphocytic choriomeningitis (LCM) were negative. Doxycycline therapy was continued for 20 days.

The Labour Protection Inspectorate did not make a decision regarding the possible occupational origin of the disease in the on-site inspection protocol.

THE ESSENCE OF Q FEVER DISEASE

Q fever is a zoonosis caused by the Coxiella burnetii bacterium. Q fever can infect virtually any animal (birds and reptiles, too), but cattle, sheep and goats are mentioned as common sources. Human cases occur among those working with these animals, as an acute or chronic disease accompanied by symptoms like fever, headache, cough, lethargy and abdominal pain. In a large percentage of the cases the disease is symptom-free and can be treated by timely administration of antibiotics.

C. burnetii is highly infectious in both humans and animals, even a few organisms can cause the disease. It persists for a long time in the environment and can travel for kilometres with the wind. The pathogen enters the human body by inhalation of contaminated aerosol or dust, or through alimentary means (e.g. raw milk) but human to human transmission is rare (ECDC, 2010; Nagy, 2013; CDC, 2011). Incubation period is 3-36 (on average 21) days.

Diagnosis: The specific antibodies can be detected from the serum. Direct detection of the pathogen is not routinely used. In Hungary, the laboratory diagnosis of Q fever is currently carried out at the International Bacterial Zoonoses Reference Laboratory of the National Public Health Institute (formerly: National Centre for Epidemiology), Department of Bacteriology II. During the serology test phases I and II IgM and IgG antibody detection using micro-immunofluorescent method, and titre determinations for serum pairs are carried out. C. burnetii PCR test may also be requested for direct pathogen detection (OEK, 2011).

Prevention

Prevention and surveillance of the disease require continuous compliance with hygienic recommendations. The fact that often the pathogen is excreted by symptom-free animals and, moreover, the animal itself is often seronegative, makes prevention more difficult.

THE ESSENCE OF WEST NILE VIRUS INFECTION (WEST NILE FEVER)

West Nile fever is a zoonosis – spreading from animals to humans, occurring regularly in Hungary. Birds are the hosts of the virus, which spreads among them via mosquitoes. The virus can travel long distances via migratory birds. The pathogen also gets into humans through mosquito bites. The seasonal period of the disease in this country is between August and October. The human to human transmission of the virus does not ordinarily occur.

The incubation period of the disease can vary between 2-14 days. About 80% of those infected will survive the infection without any symptoms and will likely develop life-long immunity. In one-fifth of the cases the disease has mostly mild symptoms (fever, muscle pain, headache, enlarged lymph nodes, skin rash) and improves on its own. Specific therapy, human vaccine is not currently available.

Blood sample, serum pair must be sent to Viral Zoonoses National Reference Laboratory of the National Public Health Institute (formerly: National Centre for Epidemiology), Division of Virology. Based on laboratory protocols testing for West Nile fever is carried out in case of negative results for more common pathogens (such as LCM, tick-borne encephalitis virus), regardless of whether the clinician suspects the disease or not.

The aetiological diagnosis is clinically important in order to distinguish West Nile fever from other viral diseases that also cause neurological symptoms (OEK, 2010).

OPINION OF THE HUNGARIAN INSTITUTE OF OCCUPATIONAL HEALTH

Serological results confirmed the dual infection. The patient could have got into contact with the Q fever pathogen, which can also be carried by birds, through inhalation of infected dust while working outdoors. He used insect repellent to protect himself from mosquito bites while working, but he could have been bitten during his leisure activities even if he had no recollection of such a bite.

According to the Committee on Occupational Diseases Caused by Chemical Pathogens and Infectious Occupational Diseases of the Hungarian Institute of Occupational Health the occupational origin of the Q fever disease confirmed by positive serology finding could not be excluded, while the occupational origin of the simultaneous, also serologically confirmed West Nile virus infection could not be proven.

REFERENCES

CDC (2011). Notes from the Field: Q Fever Outbreak Associated with Goat Farms – Washington and Montana, 2011. 2011/60(40);1393 Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6040a5.htm?s_cid=mm6040a5_w

ECDC (2010). Risk assessment on Q fever. Technical Report. Stockholm, 2010. Available at: http://ecdc.europa.eu/en/publications/Publications/1005_TER_Risk_Assessment_Qfever.pdf

NAGY, L. (2013). Q-fever: What can we know about it? (in Hungarian), available at: http://www.webbeteg.hu/cikkek/fertozo_betegseg/14610/q-laz

OEK (2010). Information of the National Centre for Epidemiology on West Nile fever and instructions on the necessary actions to be taken in case of suspicion. (in Hungarian). Available at: http://www.oek.hu/oek.web?nid=931&pid=; or: http://oek/oek.web?to=1828&nid=931&pid=1&lang=hun

OEK (2011). Q Fever outbreak from a goat-breeding farm in Washington and Montana, USA, 2011 (in Hungarian) Epinfo 18.(41); original source: CDC, Morbidity and Mortality Weekly Report, October 14, 2011, 60(40):1393