THE IMPORTANCE OF TRANSMISSION TICK-BORNE ENCEPHALITIS THROUGH MILK OF INFECTED ANIMALS

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Abstract

Tick-borne encephalitis (TBE) is a viral zoonotic disease of humans, goats, ewes, cows. Infection is found in nature in many wild and domestic animals, including dogs. The most important reservoirs of viruses in nature are small rodents. Approximately 5,000 - 12,000 cases of TBE are diagnosed in Europe each year. People are usually infected over ticks (*Ixodes ricinus*, *Ixodes persulcatus*) and infections are usually manifested by symptoms like: flu, fever, headache, encephalitis, ataxia, convulsions, tremor, paresis, paralysis and death. Paralysis occurs in 6% of cases and mortality is 1 - 2% of the Western subtype tick-born encephalitis virus (TBEV).

In recent times, the number of epidemics of this disease caused by the consumption of raw milk of infected animals increases. TBE spreads through raw milk almost every year in endemic countries. These epidemics point to the importance of the food pathway in the spread of TBEV. Raw milk often consumed people on farms because of better taste and simple preparation, or in order to prevent and treatment certain diseases. TBEV belongs to the genus *Flavivirus*, the family of *Flaviviridae*. It is enveloped RNA virus, so it is relatively sensitive on temperature and detergents. However, virus remains infectious in gastric acid (pH 1.49 - 1.80) up to two hours. During retention in the digestive tract, they do not cause the symptoms of the disease, but after reaching to other organs (encephalitis). The mechanism of infection development with TBEV is the same as food-borne infections induced by enteroviruses. Ruminants are infected during grazing by the bite of ticks; goats are particularly sensitive because of way of nutrition (grass and bushes). Goats, ewes and cows infected with TBEV virus do not show clinical signs of disease, but excrete viruses through milk. The amount of virus that is secreted by milk greatly varies between individual animals. The infectivity of the virus remains preserved in various milk products such as yogurt, cheese, butter. In samples with small number of viruses, the virus loses infectivity after treatment at 65^{0}C for five minutes, whereas in milk with higher number of viruses, the virus remains infectious after 30 minutes on this temperature. Treatment at 100 ^{0}C three minutes destroys the infectious virus.

This indicates that in order to reduce the risk of infection by TBEV before consumption milk should be pasteurized - boiled. If consumers insist on raw milk consumption, goat vaccination should be carried out in endemic areas. In immunized goats, not established presence of TBEV in milk, which means that immunization prevents viral infection and viremia. It is not yet fully known how long the immune system lasts in goats and whether the natural immunity lasts lifetime. There is a need to work on tick-borne encephalitis diagnosis in animals and humans in countries where no tests have been conducted and in which a ticks that convey the disease are present. One of the countries for which there is no information on the spread of tickborne encephalitis is also Montenegro.

***Key words**: Tick-borne encephalitis, Zoonosis, Virus, Milk, Goats, Montenegro.*