Seroprevalence of Bluetongue Virus Antibodies in Sheep of Kurdistan Province in West Of Iran

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Abstract

This study was conducted to determine the seroprevalence of bluetongue virus antibodies in sheep in Kurdistan province in west of Iran during 2011-2012. According to results, the seropositive rates of sheep in Kurdistan were 45.9%. The results showed that in area there is widespread presence of the bluetongue virus antibodies in the sheep population as 123 sheep’s out of 268 were affected.

Key words: Bluetongue, C-ELISA, Iran, Seroprevalence

Introduction

Bluetongue (BT) is a non-contagious, arthropod borne viral hemorrhagic disease of ruminants, particularly of sheep and occasionally cattle and some species of deer. It occurs mostly during periods of high temperature and rainfall, and usually disappears with the first frost or severe cold weather. Bluetongue virus (BTV) the causative agent of bluetongue disease of ruminants have now identified on all continents except Antarctica. The distribution of specific insect vectors and different BTV serotypes differs remarkably throughout the world, so specific vectors exist with specific constellations of BTV serotypes and topotypes in relatively distinct global ecosystems. The disease is not contagious from animal to animal but is spread by biting midges of the Culicoides spp genus which are the natural biological vectors of the BTV. Sheep and some wild ruminants display a variety of clinical manifestations, ranging from subclinical infections or mild disease, to acute or even fatal disease. In contrast, cattle, while commonly infected in endemic and epizootic areas, rarely develop clinical disease.

However; the strain of BTV serotype 8 that has invaded northern Europe is unusual because a large number of infected cattle also developed clinical signs. Therefore, cattle are important in transmission and acting as reservoirs for the BTV. Clinical signs may include fever, depression, excessive salivation, nasal discharge (serous, muco-purulent or bloody), facial edema, hyperemia and ulceration of the oral mucosa, coronitis, lameness, muscle weakness and death. The mortality rate and the severity of the clinical signs seem to vary with the breed and age of the animal infected (with the older age groups being more susceptible), the type and strain of the virus and certain rather ill defined
interactions with the environment. For example, animals that stressed or subjected to strong solar radiation are reputed to develop more severe clinical signs.

Although BTV is an Orbivirus, it has also shown to transmitted directly from vertebrate to vertebrate, in semen and transplacentally. However, these forms of transmission are only occasional. The incidence of bluetongue disease is therefore closely related to the distribution of the various Culicoides species which are normally associated with warm or hot climatic conditions. During outbreaks, affected countries are banned from trading in livestock and livestock products triggering serious socio-economic effects. The recent detection of eight additional BTV serotypes in the USA strongly suggests that the changes in BT distribution first detected in Europe may be a worldwide phenomenon, perhaps because of climate change. The epidemiology of BTV infection is poorly defined in much of the world, including extensive portions of Asia and the Middle East, the species, and serotypes of BTV that occur within the Middle East are poorly defined. Clinical signs and sero-prevalence investigations have confirmed the occurrence of BT disease in Iran.

Kurdistan is located to the west of Iran. These provinces have a common border with neighboring countries and local animals that live in the area frequently cross the boundaries. However, the cities in the province all have similar livestock. About 2.5% of the livestock are sheep, up to 2.4% of the goat and 0.3% of the cattle population in the province are kept; this means that any potential disease that infects the livestock could threaten the population, people, and will therefore have a great impact on the economy. In this study, the disease status of bluetongue in Kurdistan province of Iran has been investigated.

Material and Method

A total 268 sheep blood samples collected from region in this part of Iran. The blood samples were collected from Jugular vein into vacutainer tubes without EDTA. Blood samples sera was extracted and stored at -20 °C until analysis.

C-ELISA: The anti-BTV antibodies were detected in the serum samples via a competitive ELISA method using a commercial Kit (ID-Vet Innovative Diagnostics 34070 Montpellier – France). The basis of the test was centered on the competition between test sera and an anti-VP7 MAb for a VP7 antigen that was previously bound to the solid phase of the ELISA plate. The positivity/negativity of the test samples were determined from the level of inhibition recorded in relation to an anti- VP7 MAb control in the absence of test sera.

Results and Discussion

Iran is located in South West Asia. It is bound by Azerbaijan, Armenia, Turkmenistan and the Caspian Sea to the north, Afghanistan and Pakistan to the east, Iraq to the west, Turkey to the northwest, the Gulf of Persian and the Oman Sea to the south (Finger 1). There is a chance that any animals that move through the land and cross the borders of neighboring countries in the region may cause a similar disease. BTV exists throughout much of world including, the Americas, Africa, southern Asia and northern Australia. While, the virus is occasionally present in some areas in the southern part of Europe, recent developments indicate that it may be extending its range northwards into areas of Europe that have never affected before was attributed mainly to climate change and was linked to northern expansion of the major Old World vector Culicoides imicola, which is an Afro-Asiatic species of
biting midge. Various techniques have been used to detect antibodies against BTV. These include agar gel immunodiffusion (AGID), haemagglutination-inhibition (HI), complement fixation (CF), and ELISA, which are serogroup specific and serum neutralization, which is serotype specific. Only AGID and competitive-ELISA are recommended as prescribed tests for international trade in the OIE Manual of Standards for Diagnostic Tests and Vaccines. Protein VP7 is one of the major inner capsid proteins on which several serogroup specific diagnostic assays are based to differentiate antibodies to BTV from those to other orbiviruses, such as epizootic hemorrhagic disease virus (EHDV). Although BTV infection previously has been documented in Iran, Pakistan, Oman, Saudi Arabia, Turkey, India, Kuwait, Yemen and Middle East. The seroprevalence of BTV that occur within the parts of Iran are poorly defined and there have been few recent published studies from the region. Our study reports the prevalence of BT antibodies (45.9%) in sheep from the Iran. Regarding that no vaccination against BT is practiced in the Iran, the results of this serological survey would clearly indicate that BT infection occurs in sheep of the Iran as evidenced by the demonstration of specific antibodies in the sera of sheep. Iran is immediately adjacent to the BT zone where the situation (existence of disease) is unstable (Afghanistan, Iraq, Pakistan and Turkey). The agricultural economy in that area is based on pasture in extensive semi-arid rangeland; therefore, domestic ruminants come into contact when grazing. Considering the seasonal movements of different live animals, it is suggested that a risk-based approach be adopted. Iran’s strategic location in the southeast of Europe makes it an important potential source of BTV strains and serotypes that might incur into adjacent areas.

Figure 1: Map of Iran showing the location of area where the present study was conducted
Climatic factors play an important role in the occurrence of BTV infection in animals and also influence the size of vector population and periods of their seasonal activity\textsuperscript{39}. An analysis of climatic data was used to model the potential distribution of \textit{C. imicola} in Europe, predicting that \textit{C. imicola} might have spread from Spain, Greece and Italy to some areas along the Croatian coast as well as to the coastal areas of Albania, Serbia and Montenegro and Bosnia and Herzegovina\textsuperscript{13,15}. \textit{Culicoides} from Western Turkey in relation to bluetongue disease of sheep and cattle was reported\textsuperscript{20}. In the studies conducted in later years in Turkey, the seropositivity rates among sheep were detected between 0-40 percent\textsuperscript{9}. In one study, reported the results of the first serological survey for BTV infection (21.4\%) in sheep from Kazakhstan\textsuperscript{22}. The seroprevalence of BTV infection described in our study (45.9\%) in Kurdistan markedly higher than that (34.7\%) reported from West-Azerbaijan in Iran\textsuperscript{19}. The seropositivity rates 76.44\% detected in East-Azerbaijan province in the northwestern of Iran\textsuperscript{17}. Survey research shows that the BT antibody in these areas is highly. Although BTV infection of sheep is clearly widespread in northwest Iran, the specific virus serotypes and vector insects that occur within the region remain uncharacterized, as they are in adjacent countries such as Kazakhstan\textsuperscript{22}.

As per our Knowledge, this is the first study was evaluated the prevalence of antibodies to BTV in sheep in Kurdistan province in west of Iran. The results showed that a high incidence rate of BT antibodies has been detected in sheep in Iran that indicate serological evidence of exposure to infection was widely distributed in this province. There are no restrictions on the movement of animals from one region to another within the country. Thus, outbreaks may also occur due to transportation of animals. Consequently, a well-defined control strategy for preventing and controlling the BTV may be based not only on vaccination plans and vector eradication but also restriction on the movement of animals from one region to another within the country. Increases in epidemic disease may constitute a serious problem for Iran's rural economy in future, and the situation is likely to worsen in the next few years as the proportion of unvaccinated livestock increases. Hence, there is a need to act now to strengthen veterinary services in rural areas.

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**Reference**


