RESEARCH ARTICLE **(Open Access)**

Investigation of bovine brucellosis outbreak in a dairy cattle farm in Lezha, Albania

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Abstract

Lezha district was assumed as one of rare district in Albania where bovine brucellosis was not laboratory confirmed. In 2016, a programme that prescribes compulsory screening by bulk milk of all dairy herds with more than 20 animals starts with enforcement. Animals from positive herds on bulk milk should be individually tested and control measures in accordance with Albanian legislation implemented.Positive laboratory result on bovine brucellosis on bulk milk was reported in a farm in village Blinisht in Lezha. The epidemiological investigation revealed that as many as 40 animals were introduced in the farm in September 2015. Abortions in cattle started to occur in December 2015 and continued until September 2016 with a total of 12 abortions. After the positive milk ring test, sera from 49 individual animals were tested using RBPT and confirmed with CFT. Laboratory results on individual animals revealed 30 positive results (60%).

The aim of this study is to describe the active surveillance adopted for the dairy farms in Albania, standard procedures that needs to be adopted for outbreak management and shortcomings identified in this process.

Material and method: The bulk milk sample was collected from the dairy farm and analyzed by milk ring test. Individual animals from milk ring test positive farms were tested by Rose Bengal test and positive results were confirmed by complement fixation test.

Results: The absence of measures after abortions in the period of almost 10 months resulted in very high within herd prevalence. Lack of animal movement control was identified as a source of infection in the Lezha case, and one of the principle way of introduction of Brucella infection in dairy farms in Albania. Control measures applied in the Lezha case were enforced where all positive reactors were slaughtered including cleaning and disinfection of the premises.

Keywords: DiseaseOutbreak, Bovine Brucellosis, Ring Milk Test, Biosecurity, Cleaning and Disinfection.

1. Introduction

Bovine brucellosis is a bacterial infectious disease of cattle cause by *Brucella abortus* (*B.abortus).* It has a world-wide distribution and may cause serious reproductive losses in cattle industry [5]. The target tissues of *Brucella* species in ruminants are reproductive tracts and most obvious clinical sign in pregnant animals is abortion, birth of weak calves, lowering of fertility with poor conception rates, retained fetal membrane, endometritis and reduced milk yield. Typical clinical signs in males are orchitis and epididymitis.In addition to economic importance, bovine brucellosis is a most wide spread zoonotic disease and cause undulant fever in humans as a consequence of direct or indirect contact with infected cattle [3]. Cattle may be affected by occasionally by *B.melitensis*and *B. suis*.

Bovine brucellosis control and eradication is achievable through combination of main vaccination and test-and-slaughter programmes, and relevant measures such as animal identification, animal movement control, applying strictly biosecurity measures etc. The main sources of infection are infected animal which shed bacteriathrough uterine and vaginal discharge, milk, semen, foetal fluids and membranes foetal tissues. Early identification, proper diagnosis of infected animals and immediate implementation of control measures are fundamental

for a successfulcontrol program. Based on the facts that in each ml foetal fluid of infected animal are shed several billions of *Brucella* spp either from aborted or infected animal that may have a normal calving decontamination of all contaminated fomites take a special importance [1, 4, 5]. In addition, among all non-spore-forming bacteria *Brucella* species are most resistant in environment condition. *B. melitensis* survive more than 8 months in slurry, while *B. melitensis* survive more than one year. It is important to report and monitor all abortion cases, proper managment the calving process,safety disposing the fluid membranes, and aborted fetuses and cleaning and disinfection [7]. Despite that most of chemical disinfectants are effective to kill *Brucella* spp, carefully selection of disinfectants and well planning according certain condition are greatly important to stop further disease spreading. Based on such programs most Northern EuropeanUnion countries, Australia, New Zealand and much of NorthAmerica not only control the disease, but they are officially free of brucellosis [5].

Cattle population in Albania is almost half million managed in approximately 215 thousand small size farms and only 5% of them have more than 50 cattle per farm. Bovine brucellosis status is not yet clear either for its prevalence and type of *Brucella* species that affects cattle. Lezha district was assumed as one of rare district in Albania where bovine brucellosis was not laboratory confirmed. In 2016, a programme that prescribes compulsory screening by bulk milk of all dairy herds with more than 20 animals starts with enforcement. Animals from positive herds on bulk milk should be individually tested and control measures in accordance with Albanian legislation implemented.The farm “nucleus” was initially established eight years ago, from animals imported from Greece. It was an open farm and no biosecurity measures were applied.Frequently the owner bought animals in market and animal movement control was not in place. The aim of this study is to describe the active surveillance adopted for the dairy farms in Albania, standard procedures that needs to be adopted for outbreak management and shortcomings identified in this process.

2. Material and Methods

2.1. Study area and animals

The study was conducted in a private dairy farm in Blinisht village Lezha district. The farm was owned by two brothers and there was a discrepancy between data in RUDA system and in reality. Intotal,there were approximately 90 animals (including calves), 49 of them were over one-year-old that were subject of bleeding and laboratory testing.

2.2. Study design and sample collection

According the state program for controlling of bovine brucellosis, all dairy herds with more than 20 animals needs to be screened with bulk milk samples every three to four months. Samples are tested at the National Reference Laboratory in the Institute of food safety and veterinary (FSVI).In this herd, bulk milk screening started in the mid of May 2016. Initial bulk milk test result was negative beside the repeated abortion in animals which started in December 2015, which raises certain questions on the sustainability of the procedures. Abortions in the herd continued until September 2016 without attempt to collect and test samples for confirmation of the disease. Next bulk milk test was collected in November 2016 and revealed positive result. Bulk milk was collected again 20 days later and positive result was confirmed after which initial control measures were implemented, 10 months after the first abortion in the herd.Individual animals were tested and out of 90 animals 49 were bleed and blood samples were sent to FSVI. The sera samples were tested by Rose Bengal Test (RBT) as screening test according to FSVI standard operation procedures (SOP). The RBT positive samples were tested in series by employing complement fixation test (CFT) as confirmatory test running in accordance with IFSV SOP. Thirty serum samples out of 49 tested revealed positive result on CFT (apparent prevalence of 60%).

2.3. Control measures implementation

After receiving positive result on the repeated bulk milk test, official veterinarians from the Regional Agriculture Directorate (RAD) initiate control measures in the herd and place it under official supervision. Movement of animals in and out of the herd was banned. It was reported that the milk from the farm was disposed of and after identification of positive animals those were isolated. Support from IPA funded PAZA II project was requested. All positive animals were slaughtered in a dedicated abattoir.After the positive animals were culled, a thorough cleaning and disinfection was conducted;Retesting of remaining animals in the farm.

3. Results and Discussion

Figure 1 summarize the timeline of events and interventions undertaken in the infected farm. It is clear from the figure that the start of the control measures were greatly delayed, and as a result, very high within herd prevalence was present.

A team consisted of VD representative supported by PAZA II project conducted epidemiological analysis, where it was concluded that during 2015 great number of animals were introduced in the farm. No documentation on the movement of animals was available and their health status was unknown. The first abortion reported in December 2015 was in one of the newly introduced animal.

Abortion due to brucellosis usually occur after 5^{th} month of gestation and happen only once in cow lifespan [5]. Initial abortions occurred in December 2015, and continued four months later. The Figure 1 indicating the time line of events clearly suggest that 5 months after the first abortion recorded, a storm of abortion was recorded when in a period of four months a total of 10 abortions were recorded. At least one animal aborted twice in the preceding year. This finding suggests that other aborted infectious pathogen may circulate and bring in an important conclusion for compulsory reporting and monitoring of all abortion cases and a proper diagnostic panel must be established [5]. Occurrence and time of abortion further depends on the causal pathogens and the gestation status at the time of infection. Information on dates, ear tag numbers and health status of introduced animals is missing, which prevents performing more detailed epidemiological analysis to assess the likelihood of introduction of infection within the farm. In absence of such analysis, it may be reasonably assumed that the disease was introduced to the farm with the newly introduced animals which were supplied from different farms and livestock markets, but without documentation on their health status.

Veterinary clinics are relatively new and do not contracted to perform disinfection of the infected farm. Official veterinarians do not have equipment required for employment of efficient disinfection. After infected animals were removed from the farm a proper cleaning and disinfection program of the premises was designed and carried out based on scientific knowledge and in accordance with Albanian Veterinary Law. The risk for further spreading the disease was greatly reduced.

Alongside of lesion learned from managing the case of brucellosis there were pointed out several difficulties relating to the understanding the role and responsibilities of every stakeholders according the veterinary law, luck of financial support for slaughtering positive animals and associated activities such as: expenses for animal transport; slaughtering fee, expenses for cleaning and disinfection of premises and slaughter house. The destination and the meat ownership from the slaughtered positive animals was not completely clear and was questioned.Farmers have limited prospect to buy certified healthy animals. This complicate the trade with healthy animals and keeping the farm “free” from animal diseases.

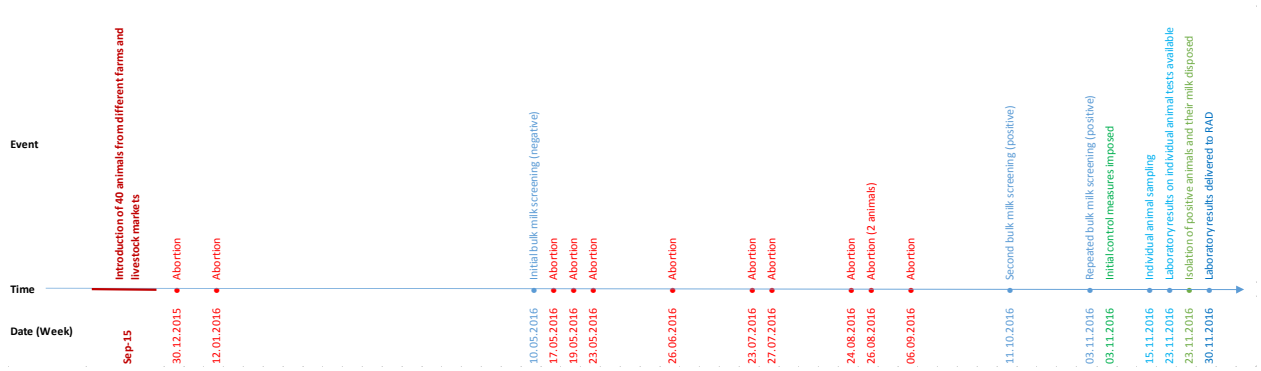

Figure1. Timeline of the events in the infected farm

4. Conclusions

A primary goal of outbreak investigations is to identify source of infection and risk factors related to stopping further spreading the disease [1,3]. In this case, although apparent lack of documented evidence, the outbreak investigations strongly suggest that the infection enters in the herd by uncontrolled movement of animals of unknown health status.In general, failure to identify putative sources may arise from ineffective investigation, inadequate information from herd keepers, absence of abortion report and their monitoring [3].

The dairy farm was established without following the minimal biosecurity criteria and it represent a common practical management system in dairy cattle in Albania, where the animal movement control is not at all in place and the farms are considered to be in high risk. Disease probably further spreads out of the infected farm since six of animals which aborted were not tested, and presumably, might no longer be on the farm. The measures undertaken to control this outbreak is one of the rarest maybe the first case that proper measures were applied in acceptable standards and may be serve as good examples to manage other bovine brucellosis outbreaks [4].

General conclusionis to improve bovine brucellosis disease surveillance in order to strengthimplementation of strategy of bovine brucellosis and other important infectious disease [4].

5. Acknowledgements

Authors would like to thank PAZA II Project for supporting this work.

6. References

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