ANIMAL AND HUMAN BRUCELLOSIS IN UGANDA: A LATENT THREAT TO LIVESTOCK PRODUCTION AND PUBLIC HEALTH

Article · June 2019

CITATIONS
0

READS
107

1 author:

Katali Benda
Makerere University
8 PUBLICATIONS **62** CITATIONS

SEE PROFILE

ANIMAL AND HUMAN BRUCELLOSIS IN UGANDA: A LATENT THREAT TO LIVESTOCK PRODUCTION AND PUBLIC HEALTH

Bugeza James[1;] Fredrick Kabi[1] Godfrey Nsereko[1;] Moses Dhikusooka[1]; Benda Katali[2]; Swidiq Mugerwa[1]; Khames Mammar[3]; Zúñiga-Ripa Amaia[3]; Blasco Jose M.[3]; Moriyón Ignacio[3]

1. *National Livestock Resources Research Institute;* 2. *National Animal Genetic Resources Centre and Data Bank;* 3. *Universidad de Navarra*

Summary

Brucellosis has been listed as one of the zoonotic diseases of major economic and public health concerns in Uganda. Economic losses arise from low herd fertility, long calving interval time, loss of replacement stock, and reduced milk production. The public health effects result from the sickness, a chronic disease that, although seldom deadly, results in incapacitating sequelae and requires a long and costly antibiotic treatment..

Here, we examine the current situation of animal and human brucellosis in Uganda, provide useful insights into its diagnosis and we propose strategies for its control.

Introduction

Organisms belonging to the genus *Brucella* are the cause of brucellosis in animals or Undulant fever in humans. Three main species namely *B. abortus, B. melitensis* and *B. suis* that infect cattle, goats and pigs, respectively, are highly pathogenic to humans. *B. canis* is also mildly pathogenic. Brucellosis in animals is a problem and, studies have shown herd prevalence of cattle brucellosis to range between 2 to 100% in Uganda. Prevalence in pigs, goats, sheep, dogs, wildlife and humans is not well known. Yet all these species can play an important role in the epidemiological cycle of brucellosis. A control strategy involving the use of suitable vaccines requires that the role of the above species in the Brucellosis epidemiological cycle be understood.

Recommendations

1. Mandatory collection and archiving of positive and negative animal and human reference sera for validation of serological tests.
2. Enhancement of core competencies of all health practioners in brucellosis diagnosis and control.
3. Discourage the use of the Febrile Antigen and ensure availability of quality Rose Bengal antigen on the Ugandan Market for both human and animal brucellosis serology.
4. Isolation, typing and archiving of *Brucella* species involved in the epidemiological cycle in Uganda.
5. Studies should be undertaken to understand the role of domestic animals and wildlife in the epidemiological cycle of brucellosis in Uganda.
6. Creation of public awareness about the disease and the options for prevention and control
7. Mass conjunctival vaccination of all domestic ruminants in defined epidemiological units using the S19 (female cattle) and Rev1 (sheep and goats, both male and female) vaccines (they should be registered in Uganda) every two years to reduce prevalence to a minimum.

CURRENT SITUATION OF ANIMAL AND HUMAN BRUCELLOSIS IN UGANDA

Brucellosis is one of the re-emerging but largely neglected zoonoses. In the last 5 years there has been an increase in public outcry arising from losses in livestock production and human health effects attributed to the disease in Uganda. As a result, Brucellosis has been included on the list of priority zoonotic diseases in Uganda. The disease has attained an endemic status with herd prevalence in cattle ranging between 2 to 100% according to published studies. However, the disease situation in other farm animals (pigs, goats, dogs, sheep) and wildlife is largely unknown.

Similarly, in humans the disease situation is not well understood. However, although their findings cannot be generalized to the entire country, studies conducted by Nabukenya *et al.,* 2012 and that of Nyehangane *et al.,* 2017 (unpublished) put the prevalence of human brucellosis between 10 and 15%. In humans, the disease is commonly found in high-risk populations like animal keepers, handlers, abattoir workers, veterinarians etc. The symptoms are non-specific, and the clinical picture closely resembles that of malaria.

Diagnosing the disease in both animals and humans is one of the critical areas that need improvement. Whereas numerous tests are available for this purpose, not all of them are suitable for resource poor settings like Uganda. Moreover, there is proof that simple tests like the Rose Bengal (RBT) (provided the test is adequately standardized and validated) that can be performed under resource poor settings have been used in brucellosis eradication programs in most countries of the world. The use of tests like iELISA or cELISA as confirmatory test for RBT positive samples is of no value as the diagnostic performance of RBT is equal or even better than that of the ELISA. Provided that the cut-offs are well proven for each situation, the ELISA only has value for comparison purposes or when automatization is required. Validation of serological tests both in livestock and humans is needed to have reliable diagnostic results. This is rarely done in Uganda. Validation requires that positive and negative reference sera (gold-standard) be collected and archived at the national livestock and human reference laboratories, respectively.

In humans, a combination of the afore mentioned occupational factors, a clinical picture compatible with brucellosis and a positive serology using suitable antigen should raise strong suspicion by the clinician. Optimally, a positive blood culture should be performed as it is the only uncontestable proof of brucellosis infection. The culture should be typed and archived at the human reference laboratory. The current use of the Febrile Antigen for serological diagnosis of human brucellosis is contestable as it yields many false positive serological reactions and should be discouraged as such. .

Similarly, a positive serology in animals should be accompanied by a demonstration of brucellae in culture at least at herd level for the confirmation of the disease. Identifying, typing and archiving the brucellae species at the animal reference laboratory should be mandatory to clarify the epidemiological cycle of the disease. In Uganda, the circulating strains are largely unknown except for *B. abortus* biovar 1, 3 and 7 reported by Mugizi *et al*., 2017.

The control of brucellosis in humans largely depends on its control in animals. The vaccines S19 and Rev1 have been used successfully to control brucellosis in cattle and small ruminants in some European countries like France and Spain. However, the RB51 vaccine currently used in Uganda is less effective than S19, has not proven successful in any brucellosis eradication program anywhere and does not solve the problem of the interference of vaccination in serological diagnosis. Moreover, a control strategy involving the use of vaccines requires that the complete epidemiological picture of the disease be clearly understood. Studies should be undertaken to understand the role of domestic animals and wildlife in the epidemiological cycle of brucellosis in Uganda.

Nevertheless, mass conjunctival vaccination of cattle (S19), goats and sheep (Rev1) every two years has been proven beneficial in the control brucellosis in resource poor settings like Uganda. However, this strategy requires (i) an active farmer involvement, (ii) identifying both the target population and the minimum epidemiological unit of intervention, (iii) assessing mean herd/flock prevalence, (iv) precise knowledge of the animal species involved, (v) access to vaccines of good quality at reasonable cost and (vi) a vaccination procedure with adequate organization of the veterinary services. Finally, continuous public awareness campaigns and training of health practitioners are also of paramount importance.