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Presence of Antibodies Against Brucellosis-Leptospirosis and Abortions in Dairy Cows in Mexico

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Abstract: Brucellosis and Leptospirosis, they are infectious illnesses of importance in Mexico, whose main symptomathology is abortion, causing severe economic losses for the dairy industry the country. The objective of the present research was to value the presence of antibodies against Brucellosis and Leptospirosis and its relationship with abortions in a farm in the State of Hidalgo, northeast of Mexico City. Total 44 animals were analyzed; 24 with antecedents of abortions and 20 taken at random without this antecedent. In both types of animals, they were carried out serological tests. The aim was to value, the presence of antibodies against Brucellosis, the agglutination technique was used in card, confirming the results with the technique of Rivanol; for the valuation of antibodies against Leptospirosis, microscopic agglutination was used. The results obtained were: 55% of presence of antibodies against Brucellosis and 46.5% for Leptospirosis in serums coming from animals with antecedents of abortions; in the obtained serums of animals without antecedents of abortions, was 20% of presence of antibodies against Brucellosis and 0% for Leptospirosis. The conclusion was that a relationship exists among Brucellosis, Leptospirosis and abortions in the dairy farm studied.

Key words: Antibodies, brucellosis, leptospirosis, abortions, dairy cows

INTRODUCTON

Brucellosis is an infectious illness that affects to the bovine ones and it is transmissible to man; it is a very important zoonosis. It causes important economic losses due to the decrease of the milk production, abortions and affects fertility. *Brucella abortus*, causing bacteria of the Brucellosis, is a bacterium that represents danger for its zoonotic character.

Brucella is eliminated by the milk and by means of uterine discharges. The growth and multiplication of the Brucella, are carried out in 2 phases; an initial, in the one that difficultly there are noxious multiplication and another successive one, in which are developed attacking to the placenta abruptly, producing fetal septicemia and therefore, abortion.

The transmission of Brucellosis, you can be in an horizontal way: placenta-fetus and in a vertical way: cow-cow, bull-cow, vectors, polluted objects, biological waste, wild animals as birds and the polluted water with urine, uterine discharges or fecal matter of miscarried cows. It happens mainly for via oral, since the cows lick the fetuses and the genital discharges that take place during an abortion. The discharges after an abortion can continue for 15 days and to continue infecting. The abortion happens mostly starting from the second half of pregnancy, for the placentary proteolysis that acquires great importance from the 4-5° month of the pregnancy that favors to the microbial metabolism. When the fetal membranes are expelled, the uterine discharge diminishes and the number of excreted microorganisms descends quickly. Although, the discharge of the genital tract is

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usually free of microorganisms after 2-3 months of the infection, some cows can be infected and excrete bacterias in an intermittent way and for many years.

In areas, where the brucellosis is endemic, the illness is controlled by vaccination that reduces the number of infected animals, allowing the eventual control of the suffering. The vaccine in use is based on the stump 19 of alive Brucellas and in lower importance, the stump vacunal *B. abortus* 45/20 composed by dead organisms in adjuvant (bacterine). Nevertheless, in the last decade, a new vaccine has been developed against brucellosis denominated stump RB51.

Leptospirosis, is an infective and contagious illness taken place by an espiroqueta *Leptospira interrogans*, it is an illness of world distribution; it affects domestic and wild mammals, as well as to the man; in bovine, it was isolated for first you see in 1946. This illness, is character zoonotic (Obando *et al*., 2000); it is produced by stumps pathogenics whose official classification is indicated that inside the gender *Leptospira* is the complex interrogans, formed for more than 200 serovarieties, gathered in 25 serogroups and all they are able to produce infection. Some are adapted to certain housedress, such it is the case of *L. hardjo* that corresponds to bovine and it produces an infection that clinically can pass desapercibide. This serovarieties possesses, the same morphological characteristics and they are physiologically uniforms, but serological and epidemically, they are different (Muñoz *et al*., 2002).

Leptospirosis, has economic and sanitary importance. The most important economic repercussion, they are the reproductive failures: mortinates, abortions or births of weak animals, decrease of the fertility and milk production.

Leptospirosis diagnosis can be divided in indirect and direct techniques. The first ones detect antibodies of the *Leptospira* and the second, to detect *Leptospiras* or their antigens and/or nucleic acids in the corporal fluids. In the event of samples coming from fetuses, the direct techniques are more suitable than the insinuations, since the individual diagnosis charges bigger importance. For the samples coming from mature animals, the indirect techniques are used more frequently since, they are simpler of carrying out and their cost is lower.

The objective of this research, was to value the presence of antibodies against Brucellosis and Leptospirosis and its relationship with abortions in a dairy farm in the State of Hidalgo, Mexico.

MATERIALS AND METHODS

Total 44 animals coming from a dairy farm of the state of Hidalgo, Mexico, were analyzed; 24 with antecedents of abortions and 20 taken at random without this antecedent type. In both types of animals, they were carried out serological tests. To value the presence of antibodies against Brucellosis, the agglutination technique was used in card, confirming the results with the technique of Rivanol; for the valuation of antibodies against Leptospirosis, the technique of microscopic agglutination was used.

RESULTS

In Table 1, the obtained results of the presence of antibodies are present in the group of animals with antecedents of abortions; they were holding of antibodies against Brucellosis of 1/25, 1/50 and 1/400 and a positivity of 50%.

The Table 2, shows the obtained results of the serovarieties from Leptospirosis to which were positive; in the group of animals with antecedents of abortions; there was a positivity of 41.6%.

The results of the group of animals that didn't present antecedents of abortions, are showed in Table 3, 20% of cows were positive to Brucellosis and 0% to Leptospirosis.

Table 1: Positivity and antibody titles against Brucelosis in cows with abortion

Cow	+/-	Antibody titles
1	+	1/25
2	-	
3	-	
4	-	
5	-	
6	+	1/25
7	-	
8	+	1/50
9	-	
10	-	
11	+	1/400
12	+	1/400
13	+	1/200
14	+	1/25
15	+	1/400
16	-	
17	-	
18	+	1/25
19	+	1/400
20	+	1/400
21	+	1/400
22	-	
23	-	
24	-	

Table 2: Serovarieties de *Leptospira* in cows with abortion

Leptospira serovarieties	Number of positive samples
Tarasovi	7
Bratislava	1
Canicola	2
Hardjo p	3
Wolffi	4
Pomona	3
Grippothyphosa	1
ACR	1
H-89	2
Palo alto	1
# Negative samples	14

Table 3: Positivity to brucelosis and Leptospirosis in cows with no abortion

Cows	*Brucella*	Title	*Leptospira*
1	-		-
2	-		-
3	-		-
4	-		-
5	-		-
6	-		-
7	-		-
8	-		-
9	-		-
10	-		-
11	-		-
12	+	1/25	-
13	-		-
14	+	1/400	-
15	+	1/400	-
16	+	1/400	-
17	-		-
18	-		-
19	-		-
20	-		-

DISCUSSION

In bovine, the Brucellosis and leptospirosis, cause important losses due to the mortinates presence, abortions, infertility, decrease of the milk production and death. Also, they are transmissible to man constituting a zoonosis of importance in public health (Samartino *et al*., 1999).

In this study, 41.6% of the total of studied animals was positive to Leptospirosis and the most present serovarieties they were *Hardjo*, *Tarasovi* and *Wolffi*, responsible for the biggest percentage of abortions caused by this disease, just as Atxaerandio *et al*. (2005) demonstrated that the sudden abortions owe to that great diversity of serovarieties of *Leptospiras* like the *Hardjo* causing big economic losses due to the infertility problem, abortions, clinical mastitis and decrease in the milk production.

In accordance with Murray (1990) in Canada, one has 3.4% of miscarried foetuses and the positive diagnosis was based on the evidence serological witch 90% of the abortions were related with infectious agents and it takes as enough it evidences the serological discoveries, in which the pathological organism was the cause of the abortion. It is therefore, as presently research can diagnose, the correlation of the presence of pathological agents (*Brucella* and *Leptospire*) according to the percentage of these agents antibodies, like test causing abortions in the dairy farm; similar data to the opposing ones for Atxaerandio *et al*. (2005) in Canada who indicated that antibodies for *Leptospira* were more frequent in miscarried cows than in cows clinically normal.

Extensive studies in the United Kingdom have indicated that certain varieties of Leptospire have bigger prevalence and association with the presence of abortions in farms, like the case of *L. hardjo*, recognizing holding positive from 1/100 and show that present microaglutination with holding of 1/10 or less than they are those that could be considered as positive. Although, cases have also been reported that takes as positive from holding of 1/400 or adults to say that they are cows whose abortions are by caused from *Leptospira* (Murray, 1990). Therefore, according to results obtained in this study, the levels of titles go from 1/100-1/400 for Leptospirosis they are considered as positive.

Atxaerandio *et al*. (2005), they also observed that titles had a relationship among the age from the seropositive cows to *Leptospira* and negative results of titles, among adult it is the age in the cows, it is lower, the levels of antibodies to this agent, since the oldest cows are more probable than they have been exposed to *Leptospira* by a more lingering period; it is possible that they generate a high resistance level to those pathogens. It is for that reason that it can be explained the fact that cows whose registrations show the presence of abortions the results of the analysis of the blood samples of these cows they went negative to *Leptospira*, that is to say, they can be old cows that were exposed a period of lingering time to this pathogen and therefore, they didn't show levels of titles considered as positive to *Leptospira*. Brucella invades the organism; it is fagocited for the macrophages and distributed to the linfoid organs where, it can persist. If the pregnancy cow, the bacteria invades the placenta producing a severe placentitis and fetal invasion causing the abortion mostly after the 5th month of the pregnancy, that which would explain 50% of the abortions, considering that the abortions of the sampled cows registered in the last third of pregnancy. The card test has a sensibility of 94.2% and a specificity of 100%; however, needs of a confirmatory test to determine if the

animal is positive for a field stump. In this research to the positive serums to the card test, they were carried out the test confirmatory of Rivanol, confirming this way the diagnoses emitted by the card test.

In this research, the results showed that 50% of the 24 studied animals were positive to *Brucella*. The high number of positive animals can be due to the aflatoxin presence and phytoestrogens in the daily feeding of the livestock, because they cause an immune depression and therefore, it doesn't allow having appropriate response to vaccinations (Muñoz *et al*., 2002).

CONCLUSION

It was 55 and 46.1% positivity to Brucellosis and Leptospirosis, respectively, in the group of animals with antecedents of abortions. The serovarieties of *Leptospira* were: *Hardjo*, *Wolffi* and *Tarassovi*. In this study, correlation between the presence of antibodies against Brucellosis and Leptospirosis and abortions was found.

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