SEROLOGICAL STUDY ON BRUCELLOSIS IN CATTLE SUFFERING FROM REPRODUCTIVE DISORDERS IN COMPARISON WITH APPARANTLY HEALTH CATTLE IN ASSIUT GOVERNORATE

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ABSTRACT

A total 1534 blood samples (348 from cattle with history of reproductive disorders include 48 abortion, 56 retained placenta & 244 repeat breader and 1186 from cattle apparantly health) were collected from different localities in Assiut Governorate, was tested for the detection of antibodies against *Brucella spp*. The results obtained by Buffer acidified plate antigen test (BAPAT) and Rose bengal test (RBT) as screening tests revealed a positive reactors percentage 4.02 & 0.51 % respectively. The Brucella positive reactors were subjected to confirmation by Tube agglutination test (TAT) and Rivanol test (Riv.T). The incidence of brucellosis was higher in cattle suffering from reproductive disorders (3.45%) in comparasion with apparantly health cattle (0.51%). The incidence of brucellosis according to type of reproductive disorders, (abortion, retained placenta & repeat breader) were 8.33, 8.9 & 1.2 % respectivly, this incidence reflect in addition to brucellosis, some other agents were involved in reproductive disorders.

Key words: Serological Study, Brucellosis, Cattle, Reproductive Disorders.

INTRODUCTION

Brucellosis is a chronic zoonotic disease caused by *Brucella species* which are Gram-negative and facultative anaerobic non-motile intracellular bacteria, with *Brucella abortus* being the principal cause of brucellosis in cattle (Cutler & Cutler, 2006).

Brucellosis in cattle is usually caused by biovars of *Brucella abortus.* In some countries, particularly in southern Europe and western Asia, where cattle are kept in close association with sheep or goats, infection can also be caused by *B. melitensis* (Verger, 1985 & Jimenez de Bagues *et al*., 1991). Occasionally, *B. suis* may cause a chronic infection in the mammary gland of cattle, but it has not been reported to cause abortion or spread to other animals (Ewalt *et al*., 1997).

Bovine brucellosis is usually caused by *Brucella abortus*, less frequently by *Brucella melitensis* and rarely by *Brucella suis*. It is characterized by abortion, with excretion of the organisms in uterine discharge and milk. Major economic losses result from abortion. Loss of calves, reduced milk yield in females and infertility in males (WHO, 1971).

Bovine brucellosis, caused by *Brucella abortus*, is a serious zoonotic disease manifested by reproductive disorders such as abortions, infertility, retention of placenta, stillbirth and calf loss in animals, and results in huge economic losses to dairy farmers (Radostits *et al*., 2000 & Singh *et al*., 2002).

Brucellosis is reported as a cause of abortion, retention of placenta, repeat breeding, infertility and prolonged intercalving period due to early embryonic deaths (Roberts, 1999).

Brucellosis is a highly contagious, zoonotic, and economically important bacterial disease of animals worldwide (OIE, 2000). It causes significant economic losses including abortion, loss in milk production, low fertility rates, and cost of replacement of animals (McDermott & Arimi, 2002).

Brucellosis is a widespread and highly infectious zoonosis disease, with a great economical impact on cattle farming. The infection is caused by *Brucella abortus*, and it is characterized by abortion, metritis, orchitis and epididymitis. The disease in cattle mainly affects the reproductive organs of infected animals (England *et al.,* 2004).

Cattle Brucellosis is usually caused by *Brucella abortus* biovars and occasionally by *Brucella melitensis* (OIE, 2008). In Egypt, starting from 1998 *Brucella melitensis* was reported to be the common strain isolated from cattle as reported by Shalaby *et al.* (2003); Sayour (2004) and Shehata (2004). The disease is mainly characterized by abortion, stillbirths or weak calves and lactating cows may show decrease in milk yield (Matope *et al.,* 2010).

BAPAT and RBPT serological tests revealed the highest rate of sensitivity that guide us to use these tests as screening tests on animals brucellosis. Riv test showing the highest rate of specificity that bearing in mind the BAPAT and RBT positive samples should be confirmed by this test (Montasser *et al.*, 2011).

The prevalence of brucellosis was higher in animals suffering from reproductive troubles (34.52%) than among animals apparantly health (6.07%) (Ammar *et al.*, 2005).

So the objectives of the present investigation was intended to throw light on the incidence of brucellosis in cattle suffering from reproductive disorders in comparison with apparently health cattle.

MATERIALS and METHODS

➢ **Samples collection :**
A total 1534 blood samples (348 from cattle with history of reproductive disorders include, 48 abortion, 56 retained placenta & 244 repeat breader, and 1186 from cattle apparently health) were collected under strict hygienic condition from different localities. Blood samples were sent to the laboratory as soon as possible, were allowed to clot and the sera were obtained by centrifugation and stored at -20 C° until performing serological tests.

➢ **Serological Examination:**
All used four antigens were obtained from
Veterinary Serum and Vaccine Research Institute - Abbasia, Cairo - Egypt.

All sera were screened for antibodies against Brucella by BAPAT as discribed by Angus & Barton (1984), and RBT as discribed by Alton *et al.* (1988). All positive serum samples were further retested by TAT and Riv T as quanitative confirmatory tests described by Alton *et al.* (1988).

RESULTS

All data obtained through the investigation were illustrated in Tables 1-3.

Table 1: Incidence of brucellosis in cattle suffering from reproductive disorders in comparison with apparently healthy cattle.

Reproductive status of examined cattle	Total number	RBT		BAPAT		TAT		Riv.T	
		+ve	%	+ve	%	+ve	%	+ve	%
Cattle apparantly healthy	1186	6	0.51	6	0.51	6	0.51	6	0.51
Cattle with history of reproductive disorders	348	14	4.02	14	4.02	12	3.45	12	3.45

Table 2: Incidence of brucellosis in cattle according to type of reproductive disorders.

Type of reproductive disorders	No of examined samples	Positive seroreactive samples	
		No	%
Abortion	48	4	8.33
Retained placenta	56	5	8.9
Repeat breader	244	3	1.2
Total	348	12	3.45

Table 3: Different serological reactions for seroreactive samples.

Reproductive status of examined cattle	Total Reactors	RBPT	BAPAT	TAT							Rivanol					
				1/10	1/20	1/40	1/80	1/160	1/320	Total	1/25	1/50	1/100	1/200	1/400	Total
Cattle Apparently Healthy	6	6	6	-	-	-	2	2	2	6	1	2	-	1	2	6
Cattle with history of reproductive disorders	14	14	14	-	2	2	2	3	5	14	1	3	1	2	5	12

DISCUSSION

Brucellosis is still a major problem in several countries including Egypt. The disease is one of the most serious disease reducing animals productivity and reproductivity and also constitute a public health hazard (Benkirane, 1997).

Surveillance of brucellosis in animals is of great importance and considered the angle stone for better understanding of the disease and improving the control and eradication policy (Fosgate et al., 2003).

In the present study, the obtained results revealed that BAPAT and RBT showed high rate of sensitivity as screening tests where no missed positive cases, these findings agreed with El-Gibaly (1993) and Montasser et al. (2011), while Angus & Barton (1984) and Gall & Nielsen (2004) showed that BAPAT was more sensitive and accurate than the other conventional tests for detection of brucella in bovine serum. This was attributed in part to the instability of some of the antigen preparations used in the other tests and also may attributed to the pH(4) that could overcome the problem of non specific reactions, morever Shalaby et al. (2003) said that BAPAT is a suprior test and can detect low titres missed by TAT. The confirmation with Rivanol test is also rocommended due to its high specificity and reliability in detecting the infected cases without serious number of false positive (Huber & Nicolleti, 1986).

The number of the positive cases to Rivanol test (Table 3) seemed to be less than that of those on both RBPT, BAPAT and TAT. These results are inagreement with the results reported by Shalaby et al. (2003), it may be due to the precipitating activity of the Rivanol solution on the IgM as recorded by Pietz and Cowart (1980).

Our findings revealed also that the dilution at which the Rivanol test gave positive results varied from 1/25 up to 1/400 and this indicates true positive cases because the test determines the agglutinating activity of the IgG after destroying the IgM (Alton et al., 1988). These findings are inagreement with (Shalaby et al., 2003).

The obtained result as shown in Table (1) revealed the prevalence of brucellosis in apparently health cattle was (0.51 %). This result agrees with that obtained by Abd El-Hafeez et al. (2001) (0.53 %) and lower than the result recorded by Seddek (1999) (2.81%). The variation in the prevaleence of brucellosis may be due to animal population, their susceptibility, vaccination status and the hygienic measures applied.

Correlation between the rate of brucella infecction with the reproductive status of the examined animals as shown in Table (1) revealed that the rate of brucella infection was higher among cattle with a history of reproductive disorders (3.45 %) than those among cattle apparently health without history of reproductive disorders (0.51 %). These finding are inagreement with the results recorded by Hafez (1980); EL-Gamel (2004) and Ammar et al. (2005) who reported that abortion, retained placenta and infertility were the principle guide accompanying infection with brucellosis. On the other hand, animals which were seropositive and had no history of reproductive disorders constitute the major soures of infection and control failure. Similar result was recorded by Njiro et al. (2011) they recorded 3.8 % prevalence of brucellosis in cattle with history of reproductive disorders.

According to the type of reproductive disorders, the obtained results as showed in Table (2) revealed that the incidence of brucellosis relative to abortion was 8.33 %. This result agreed with Teferi Degefa et al. (2011) they found that the prevalence of abortion was 8.7 % and Amin et al. (2004) recorded 12 %. While lower incidence 3.2 % was reported by Ibrahim (2003). This difference in prevalence rate

may be due to the variation in cattle husbandry management system.

The gained result Table (2) declared that the incidence of retained placenta was 8.9 % .Similar results were also reported by Ahmed *et al.* (1992) and Amin *et al.* (2004) they found 7.14 & 7.41 % respectively. While higher incidence 16.8 &18.3 % were recorded by Gebre-Mariam (1996) and Teferi Degefa *et al.* (2011) respectivly.

The finding of the present study (Table 2) revealed that low incidence of repeat breeder 1.2 %. Nearly similar finding were noticed by Ahmed *et al.* (1992) and Amin *et al.* (2004) they recorded 3.16 & 1.64 % prevalence of brucellosis respectively.

From these obtained results, we can conclude that Brucella infection still higher among cattle with history of reproductive disorders, which need more efforts and an effective plan for control and eradication of the disease. The high prevalence of abortion and retained placenta together with this low incidence of brucellosis may suggest the presence of other causes of reproductive disease in addition to Brucella.

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دراسة سيرولوجية عن البروسيلا في أبقار تعاني من مشاكل تناسلية بالمقارنة مع أبقار سليمة ظاهريا في محافظة أسيوط

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نظرا لاهمية مرض البروسيلا من الناحية الصحية والتناسلية للحيوان وما يسببه من خسائر اقتصادية نتيجة الاجهاض واحتباس المشيمة وبعض المشاكل الاخري فكان من الضرورى اجراء هذه الدراسة لتحديد نسبة الاصابة بالبروسيلا في الابقار التي تعاني من مشاكل تناسلية ومقارنتها بنسب الاصابة في الابقار السليمة ظاهريا باستخدام الاختبارات السيرولوجية المختلفة. أجريت هذه الدراسة علي عدد ١٥٣٤ من الابقار (٣٤٨ بقرة تعاني من مشاكل تناسلية شملت ٤٨حالة إجهاض و٥٦ إحتباس مشيمة و٢٤٤ شياع متكرر و ١١٨٦ بقرة سليمة ظاهريا) حيث تم جمع عينات الدم منها. تم فحص العينات سيرولوجيا للبروسيلا باختباري الروزبنجال والمحمض المخمد الشريحي وقد خضعت العينات الايجابية لهذين الاختبارين لاختباري التلازن الانبوبي البطئ والريفانول. أظهرت النتائج ان نسبة الاصابة بالمرض كانت مرتفعة في الابقار التي تعاني من مشاكل تناسلية (٣.٤٥ ٪) عنها في الابقار السليمة ظاهريا (٠.٥١ ٪) بينما كانت نسبة الاصابة في الحالات التى تعانى من مشاكل تناسلية (إجهاض وإحتباس مشيمة وشياع متكرر) ٨.٣٣ و٨.٩ و١.٢ ٪ على التوالى.

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