Detection of bovine tuberculosis in Wasit city by the use of comparative intradermal tuberculin test and antigen rapid bovine TB Ab test

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Abstract
The study was conducted on twenty eight (28) cows in some villages in Wasit city / Iraq, scanned by using the comparative intradermal tuberculin test and antigen rapid bovine TB Ab test, to determine the morbidity rates of bovine tuberculosis (TB) and also to evaluate the efficiency of the two tests in the diagnosis of bovine TB. Post mortem examinations also were done after slaughter of animals to confirm the TB lesions. Twenty one (21) cows (75%) were positive in the tuberculin test, while (7) cows (25%) were negative. Twenty two (22) cows (78.57%) gave positive results to the antigen rapid bovine TB Ab test, and (6) cows (21.43%) gave negative results. It was noticed that most of the positive tuberculin animals were also positive to the antigen rapid bovine TB Ab test, due to the MP70 antigen present in the rapid test kit is a major component of M. bovis. On post mortem examination nineteen (19) cows (67.85%) seen had the tubercle lesions in many organs like liver (19.05%), lung (14.28%), intestine (14.28%), mesenteric lymph nodes (19.05%), retropharyngeal lymph nodes (19.05%) and mediastinal lymph nodes (14.28%). It was concluded that the use of combination of tuberculin test and antigen rapid bovine TB Ab test together gives a better results in the diagnosis of bovine TB than the use of a single test alone.

Key words: Bovine tuberculosis, cattle, tuberculin test, rapid TB Ab test.

มะเร็งในสัตว์ใหญ่: บัฟเฟล, โรคที่รักษาได้, Antigen Rapid Bovine TB Ab test.

المقام والاختبار السريع للأسجاس المعنوية لميكروب السل

الخلاصة
تُجري الدراسة على (28) بغرة في عدة قرى بمحافظة بغداد، وذلك لتحديد نسبة الإصابة بمرض السل البقرى باستخدام كل من اختبار السل المقارن و الاختبار السريع للاسجاس المعنوية لميكروب السل وكذلك لتقسيم فكرة هذان الاختباران في التشخيص من الحيوانات. كما جرى فحص جثة الحيوانات بعد الذهبي لتأكيد التشخيص. أعطى اختبار السل المقارن نتائج موجبة (21) فرقة ونسبة (75%) و أخطى نتائج سالبة (7) ابصار ونسبة (25%) أما اختبار السريع للأسجاس المعنوية ف أعطى نتائج موجبة (22) فرقة ونسبة (78.57%) و نتائج سالبة (6) ونسبة (21.43%) و وحده أن معظم الأبقار الموجبة لاختبار السرير المقارن كانت أيضاً نتائج لاختبار السريع للأسجاس المعنوية وهذا بسبب أن الأنتيجين 70 موجود في الاختبار السريع للأسجاس المعنوية هو من المكونات الرئيسية لجرثومة M. bovis. عند نتائج الابصارات وآراء الصفة التشريحية على حرف (19) فرقة ونسبة (85%) لديها نتائج موجبة (19.05%) والركتين (14.28%) والأمعاء (14.28%) والغدد المغلفة المنسقية (19.05%) والمنصفية (14.28%) والتهوية (19.05%). نتائج هذا أن استخدام اختبار السل المقارن مع الاختبار السريع للأسجاس المعنوية يعني نتائج جيدة أكثر من استخدام كل اختبار على حدة

الكلمات المفتاحية: السل البقرى, الاختبار, اختبار السل المقارن, الاختبار السريع للأسجاس المعنوية لميكروب السل.
**Introduction**

Bovine tuberculosis is a chronic bacterial disease of cattle that occasionally affect other species of mammals & humans, it results from infection by *M. bovis*. Its spread by the inhalation of aerosols or the ingestion of contaminated food or through breaks in the skin or congenital by infected semen (1). Bovine tuberculosis is wide spread in Africa and parts of the Middle East countries (2). The economic losses caused by the disease are not only reduction of 10-20% in milk production and weight but also due to infertility and contamination of meat and high mortality rates (3). The disease is difficult to control in livestock because of the lack of an effective vaccine, the presence of wildlife reservoir and lack of a diagnostic assay with sufficient sensitivity and specificity to detect animals at all stages of infection (1). Tuberculin test effectively detect early stages of the disease allowing immediate removal of infected animals and limiting transmission of the disease (4) and when its used in parallel with rapid bovine TB Ab test offers an improved detection of the disease in comparison to individual test (5). The aim of this study is to determine the morbidity rates of bovine tuberculosis in Wasit city and estimating the efficacy of both tuberculin test and rapid bovine TB Ab test under field conditions in comparison with post mortem examinations.

**Materials and methods**

Twenty eight (28) cross breed dairy cows in some villages in Wasit city / Iraq were scanned by using the comparative intradermal tuberculin test according to (6) using both avian and bovine tuberculin antigens supplied by (Prionics, Healthy animals Inc., UK), and antigen rapid bovine TB Ab test, to determine the morbidity rates of bovine tuberculosis (TB) and also to evaluate the efficiency of the two tests in the diagnosis of bovine TB. 10 ml of whole blood were collected from each cow to obtain serum for the antigen rapid bovine TB. Ab. test which was performed on the serum samples according to the manufacturer's instructions (Anigen animal genetics inc., Korea). Post mortem examinations also were done after slaughter of animals to confirm the TB lesions, by careful inspection and examination of the carcass, head and viscera of each animal.

**Results**

Out of (28) cows examined with comparative tuberculin test (21) cows gave positive reactions (75%). (Fig. 1), and (7) cows were negative (25%), and twenty two cows with a percentage of (78.57%) gave positive results for antigen rapid bovine TB. Ab test (Fig. 2). On post mortem examination (19) cows with a percentage of (67.85%) have showed tubercle lesions (Table 1). The lesions were in more than one organ in the same animal and mostly in lungs, liver, intestine, mesenteric L.N., mediastinal L.N. and pharyngeal L.N. (Table 2), (figs. 3, 4,5).

![Image](image1.png)

![Image](image2.png)

Fig.(1) Positive results of comparative tuberculin test.
Table. (1) Results of the tuberculin test, Rapid TB Ab test and post mortem examination.

<table>
<thead>
<tr>
<th>No. of animals</th>
<th>Comparative tuberculin test</th>
<th>Rapid TB Ab test</th>
<th>Post mortem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>positive</td>
<td>negative</td>
<td>positive</td>
</tr>
<tr>
<td>28</td>
<td>21</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>75%</td>
<td>25%</td>
<td>78.57%</td>
</tr>
</tbody>
</table>

Fig. (2) positive results of the antigen rapid bovine TB. Ab test.

Fig. (3) The tubercle lesions in liver.

Fig. (4) The tubercle lesions in spleen.

Fig. (5) The tubercle lesions in mesenteric L.N.

Table (2) No. of lesions in bovine TB in different organs

<table>
<thead>
<tr>
<th>Organ</th>
<th>No. of positive cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver</td>
<td>4</td>
<td>19.05%</td>
</tr>
<tr>
<td>Lung</td>
<td>3</td>
<td>14.28%</td>
</tr>
<tr>
<td>Intestine</td>
<td>3</td>
<td>14.28%</td>
</tr>
<tr>
<td>Mesenteric L.N.</td>
<td>4</td>
<td>19.05%</td>
</tr>
<tr>
<td>Mediastinal L.N.</td>
<td>3</td>
<td>14.28%</td>
</tr>
<tr>
<td>Retropharyngeal L.N.</td>
<td>4</td>
<td>19.05%</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The high percentage of infection were found in the study according to tuberculin test agrees with (7, 8) who also found high infection rates in dairy stations in Iraq and this is due to leaving the routine control programs of bovine TB. Which include efficient diagnosis and slaughtering infected animals (9, 10). But It disagree with a study in Egypt in 2010 where the infection rate was (4.3%) (11) and also in Nigeria (2.8%) (12) which indicate the presence of some false positive results in tuberculin test due to many
Factors such as the immune state of the animal and the type of the tuberculin used (13, 14). It also found that some animals gave positive results for tuberculin test without any visible lesions which may be due to the non-specific reactions due to the atypical mycobacteria or other bacteria like Nocardia (11) or it may be as mentioned by (15, 16) that these positive animals has been slaughtered in the early stages of the disease where the tubercle lesions are invisible or present in other organs of the body not examined during the routine PM, like bones and brain. Although most national TB control programs depend on detection of cellular response, but serological assays in eradication programs may be useful because assay of cell mediated immunity may fail to detect animals in advanced stages of disease (17). Our results agreed with (12) who found that (62%) of cows gave positive results in antigen rapid bovine TB. Ab. test and disagreed with (18) who mentioned that the antigen rapid bovine TB. Ab. test alone is not efficient in diagnosis of TB and that the serological tests like ELIZA must be used to validate results. The negative results of rapid bovine TB. Ab. test may occur due to the fact that the low titer of Ab. to the mycobacteria Ag M bovis infection where the Ag is secreted to the blood circulation in a large amount causing temporary suppression for Ab formation (19,20). It was noticed that most of positive tuberculin animals were also positive to the rapid test and this is due to MP70 antigen present in the rapid test kit is a major component of M. bovis (21) and the great agreement between the two tests in diagnosis of active cases agrees with (11) who indicated agreement rates of (81.9%) and (22) who found 93% agreement percentage. All animals with lesions on PM examinations were also positive to tuberculin test and rapid test and this agree with (8,11,12) who indicated that the use of tuberculin test, PM examinations and culture are the best methods for detecting the prevalence of bovine TB in cattle herds, and our results disagree with (18) who found that the PM examination has no value in detecting the acute stages of the disease unlike the rapid test that gives good results in these cases due to the fact that lesions in acute stages is unapparent and become apparent only in chronic cases.

References
12-Danbirni S, Sackey AKB, Kudi AC, Okaiyeto SO and Pewan SB (2009). A comparison of one-step anigen rapid bovine tuberculosis antibodies test sensitivity to postmortem gross lesions in


