EVALUATION OF DIRECT FLUORESCENT ANTIBODY AND ENZYME LINKED IMMUNOSORBENT ASSAY VERSUS COPROMICROSCOPY IN DIAGNOSIS OF CRYPTOSPORIDIOSIS

By

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ABSTRACT

**Background:** Cryptosporidium oocysts detection methods include alternate bright-field stains and negative stains. These methods show high sensitivities but it may leave some oocysts unstained.

**Objective:** Evaluation of the direct fluorescence antibody (DFA) and coproantigens by ELISA versus modified Ziehl–Neelsen (MZN) stained smears in detection of Cryptosporidium.

**Material and Methods:** Eighty two immunocompromised patients having acute/chronic diarrhea, were selected from the attendants of the pediatrics, oncology and nephrology clinics in Al-Azhar University Hospitals, during the period from August 2013 to May 2014. All cases were subjected to history taking and clinical examination, laboratory examination of their fecal smears by microscopic examination of MZN stained smears, detection of coproantigens by ELISA and DFA for diagnosis of Cryptosporidium.

**Results:** Fifteen (18.29%) of the individuals were positive for Cryptosporidium infection using modified Ziehl–Neelsen stain, and 17 (20.73%) were positive by direct fluorescent antibody, while ELISA detect crypto-coproantigen in 18 (21.95%). Statistically, there were highly significant relations between ELISA, DFA, and MZN. The sensitivity, specificity, and positive and negative predictive values of DFA test were 100, 97, 88.2 and 100 %, respectively, and for ELISA test were 100, 95.5, 83.3 and 100%, respectively, compared with MZN method as the gold standard test for detection of Cryptosporidium.

**Conclusion:** Modified Ziehl-Neelsen staining remained the gold standard for the detection of Cryptosporidium spp., but it may leave some oocysts unstained. So, the immunofluorescence assays were the methods of choice for greatest sensitivity and specificity especially when oocyst numbers in stool specimens were low.

INTRODUCTION

Cryptosporidium infection is increasingly recognized as a major cause of diarrheal disease worldwide in all age groups. The range of people affected is broad including immuno-suppressed people and children, especially in developing countries. Symptoms of the disease are diverse, 90% of patients have diarrhea which is often associated with other gastrointestinal symptoms such as vomiting, nausea or abdominal pain (Chalmers, 2010).

The infective stage of Cryptosporidium (oocysts) is ubiquitous in the environment,
being transmitted via the fecal-oral route either through the ingestion of contaminated water or food or direct contact with infected individuals or animals (Karanis et al., 2007 and Smith et al., 2007).

Diagnosis of cryptosporidiosis depends mainly on the acid-fast staining methods, with or without stool concentration which is the most frequently used in clinical laboratories. These methods include alternate bright-field stains, negative stains and fluorescent stains (Garcia, 2001). These methods show high sensitivities and may leave some oocysts unstained (Zimmerman and Needham, 1995). For greatest sensitivity and specificity, immunofluorescence assays are the methods of choice (Garcia et al., 1992). Although available antigen detection assays are superior to microscopic examination, these methods require multiple reagent additions, washing steps and incubations (Chan et al., 2000).

Light microscopy is recognized as the "gold standard" for definitive diagnosis of Cryptosporidium in a clinical setting, using various techniques for concentration of oocysts in fecal specimens. A number of staining have been developed, but many have problems of sensitivity and specificity often with variable results between laboratories (Zajac et al., 2002). Immunofluorescence methods have provided enhanced sensitivity and specificity over the conventional staining methods, especially when oocyst numbers in stool specimens were low. Prevalence studies should particularly gain benefit from immunofluorescence assays, since a symptomatically infected individuals may shed oocysts in small numbers (Angus et al., 1981).

The big advantage of microscopy is that it is not specific and, therefore, other parasite can be detected which may be important in determining the cause of non specific symptoms such as diarrhea. It should be remembered that Cryptosporidium can be found in stool in the absence of clinical signs (Kaushik et al., 2008).

Sometimes, the standard diagnostic laboratory procedures may not be sufficient to confirm infection, or specimen collection may not be practical. In these circumstances, alternative methods may be helpful including antigen, antibody and nucleic acid detection (Garcia, 2001).

As a result, immunoassays for the detection of Cryptosporidium stool antigens have replaced microscopy as the routine diagnostic procedure of choice in many hospitals and public health laboratories (Garcia et al., 1997). The most widely used antigen detection immunoassays for Cryptosporidium are the direct fluorescent-antibody (DFA) tests which detect intact organisms (Garcia et al., 1992), and enzyme immunoassays which detect soluble stool antigens (Garcia and Shimizu, 2000).

Much attention should be focused on the specific pathogens as causes of chronic or intermittent diarrhea in immunocompromized patients, since its correct treatment could improve the patient general well being (Alemu et al., 2011).

The aim of this work was to evaluate the direct fluorescent antibody and
EVALUATION OF DIRECT FLUORESCENT ANTIBODY AND ENZYME... 353

coproantigen (ELISA) versus modified Ziehl–Neelsen staining method in detection of *cryptosporidium*.

**SUBJECTS AND METHODS**

Eighty two immunocompromised patients (40 males and 42 females), ranging in age from 6 months to 60 years and having acute/chronic diarrhea, were selected from the attendants of the pediatrics, oncology and nephrology clinics in Al-Azhar University Hospitals, during the period from August 2013 to May 2014. All subjects had to fulfill one of the following criteria: Children with protein energy malnutrition, diabetes of more than one year, corticosteroids therapy for more than one year, malignancy or end stage renal failure. Informed consent was obtained from all patients or their parents when patients were under 18 years old.

All individuals were subjected to:

1. **History taking and clinical examination:** Name, sex, age, occupation, address, traveling, duration of symptoms, frequency of symptoms, complaint taking for presence of gastro-intestinal symptoms (nausea - vomiting - dyspepsia - constipation - diarrhea - dysentery - abdominal distention or enlargement) and gastro-intestinal signs as abdominal tenderness, hepatomegaly, ascites or signs of dehydration.

2. **Laboratory examination:**

   **Stool samples examination:** All stool samples collected were examined microscopically by direct smear (with and without iodine staining) and by formol-ether concentration for the presence of Cryptosporidium oocysts and for detection of other parasites. For detection of Cryptosporidium oocysts, samples were examined by direct smearing and concentrating with formol-ether technique, Microscopic examination of modified Ziehl-Neelsen stained smears, RIDA screen Cryptosporidium coproantigen (ELISA) and direct immunofluorescence antibody (DFA).

   **Coproantigen (ELISA) (R-Biopharm AG, Darmstadt, Germany):** Diagnosis of *cryptosporidium* was performed in all stool samples using the method described by the manufacturer.

   **Direct immunofluorescent antibody (DFA) (Sterling et al., 1986):** In direct immunofluorescence, a FITC-labelled MAb reactive with genus-specific surface-exposed epitopes on Cryptosporidium oocysts binds to oocysts present in the sample.

**Statistical analysis:** Data were collected, revised, coded and entered to the Statistical Package for the Social Science (IBM SPSS) version 20. Qualitative data were presented as number and percentages, while quantitative data were presented as mean, standard deviations and ranges. The comparison between two groups with qualitative data were done using Chi-square test; Fisher exact test was used instead of Chi-square test when the expected count in any cell was found less than 5. Receiver operating characteristic curve (ROC) was used to assess the sensitivity, specificity, positive prediction value (PPV), negative prediction value (NPV), false positive rate (FPR), and false negative rate (FNR) of DFA and ELISA using MZN as the gold standard test.

Sensitivity of the test =

\[
\frac{\text{Number of true positives}}{\text{Number of true positives} + \text{Number of false negatives}} \times 100
\]
The sensitivity, specificity, and positive and negative predictive values of DFA test were 100, 97, 88.2 and 100 %, respectively, and for ELISA test were 100, 95.5, 83.3 and 100%, respectively, compared with MZN method as the gold standard test for detection of the Cryptosporidium. The strength of agreement between DFA test and MZN method for detection of Cryptosporidium was categorized as perfect correlation with a kappa value of 0.92. Also, the strength of agreement between ELISA test and MZN method for detection of Cryptosporidium was categorized as perfect correlation with a kappa value of 0.88 (Table 2).

There was no statistically significant difference between the three tests regarding sex (Table 3).

Prevalence of cryptosporidiosis was significantly higher among age group up to 5 years using MZN stain (χ² = 9.034, p= 0.028), DFA (χ² = 10.381, p= 0.015) and by coproantigen detection (χ² = 16.113, p= 0.001) (Table 4).

Cryptosporidium was present alone in 60% of positive cases, with one parasite in 20%, with two parasites in 13.33% and with more than two parasites in 6.67% (Table 5).

One asymptomatic case occurred (11.11%), while symptomatic cases were 8 cases (88.88%), and distributed as having abdominal pain in 7 cases (77.77%), jaundice in 2 cases (22.22%), abdominal distension in 5 cases (55.55%) and with diarrhea in 6 cases (66.66%) (Table 6).

Signs of symptomatic cases distributed as having tender abdomen in 7 cases (87.5%), hepatomegaly in 5 cases (62.5%), dehydration in 6 cases (75%) and with ascites in 3 cases (37.5%) (Table 7).

RESULTS

This study showed that 15 (18.29%) of the cases were positive for Cryptosporidium infection using modified Ziehl-Neeelsen stain and 17 (20.73%) were positive by direct fluorescent antibody while ELISA detect crypto-coproantigen in 18 (21.95%). There was a statistically significant relation between both ELISA, DFA, and MZN as the gold standard test (P < 0.001) (Table 1).

The sensitivity, specificity, and positive and negative predictive values of
**EVALUATION OF DIRECT FLUORESCENT ANTIBODY AND ENZYME LINKED IMMUNOSORBITENT ASSAY (ELISA) FOR DETECTION OF CRYPTOSPORIDIUM CASES**

**Table (1):** Diagnosis of *Cryptosporidium* cases by Modified Ziehl–Neelsen stain (MZN), Direct fluorescent antibody (DFA), Coproantigen (ELISA).

<table>
<thead>
<tr>
<th>Other tests</th>
<th>MZN</th>
<th>Positive MZN (no. = 15)</th>
<th>Negative MZN (no. = 67)</th>
<th>Chi-square test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>X²</td>
</tr>
<tr>
<td>ELISA</td>
<td>Positive</td>
<td>15</td>
<td>100.0%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>0</td>
<td>0.0%</td>
<td>64</td>
</tr>
<tr>
<td>DFA</td>
<td>Positive</td>
<td>15</td>
<td>100.0%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>0</td>
<td>0.0%</td>
<td>65</td>
</tr>
</tbody>
</table>

**Table (2):** The test performance of DFA and coproantigen (ELISA) test kit for detection of *Cryptosporidium* cases in comparison with (MZN) method.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Tests</th>
<th>DFA</th>
<th>ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Specificity</td>
<td>97.0%</td>
<td>95.5%</td>
<td></td>
</tr>
<tr>
<td>PPV</td>
<td>88.2%</td>
<td>83.3%</td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>FPR</td>
<td>3.0%</td>
<td>4.5%</td>
<td></td>
</tr>
<tr>
<td>FNR</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Agreement between tests kappa</td>
<td>0.92</td>
<td>0.88</td>
<td></td>
</tr>
</tbody>
</table>

**Table (3):** Sex distribution among *Cryptosporidium* cases.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Methods</th>
<th>MZN</th>
<th>DFA</th>
<th>ELISA</th>
<th>X²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (40)</td>
<td>7 (17.5%)</td>
<td>6 (15%)</td>
<td>8 (20%)</td>
<td>0.492</td>
<td>0.781</td>
<td></td>
</tr>
<tr>
<td>Female (42)</td>
<td>8 (19.05%)</td>
<td>11 (26.19%)</td>
<td>10 (23.81%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (82)</td>
<td>15 (18.29%)</td>
<td>17 (20.73%)</td>
<td>18 (21.95%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Table (4): Age distribution among the Cryptosporidium cases:

<table>
<thead>
<tr>
<th>Age</th>
<th>Methods</th>
<th>N/Z</th>
<th>DFA</th>
<th>Coproantigen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5 (15)</td>
<td></td>
<td>4 (26.67%)</td>
<td>4 (26.67%)</td>
<td>5 (33.33%)</td>
</tr>
<tr>
<td>&gt; 5-20 (16)</td>
<td></td>
<td>4 (25%)</td>
<td>4 (25%)</td>
<td>5 (31.25%)</td>
</tr>
<tr>
<td>&gt;20-40 (25)</td>
<td></td>
<td>3 (12%)</td>
<td>3 (12%)</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>&gt;40 (26)</td>
<td></td>
<td>4 (15.38%)</td>
<td>6 (23.08%)</td>
<td>5 (19.23%)</td>
</tr>
<tr>
<td>Total (82)</td>
<td></td>
<td>15 (18.29%)</td>
<td>17 (20.73%)</td>
<td>18 (21.95%)</td>
</tr>
</tbody>
</table>

Table (5): Co-existing of Cryptosporidium with other parasites.

<table>
<thead>
<tr>
<th>Cryptosporidium alone</th>
<th>No. of patients</th>
<th>% (n=15)</th>
<th>Other parasite detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium alone</td>
<td>9</td>
<td>60%</td>
<td>No one</td>
</tr>
<tr>
<td>With one parasite</td>
<td>3</td>
<td>20%</td>
<td>- with E. histolytica (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with G. lamblia (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with Isospora (1)</td>
</tr>
<tr>
<td>With two parasite</td>
<td>2</td>
<td>13.33%</td>
<td>- with G. lamblia + B. hominis (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with Strongyloides spp. + E. histolytic (1)</td>
</tr>
<tr>
<td>With more than two parasite</td>
<td>1</td>
<td>6.67%</td>
<td>- with H. nana + G. lamblia + B. hominis (1)</td>
</tr>
</tbody>
</table>

Table (6): Clinical presentation among cryptosporidiosis patient (single infection).

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Numbers</th>
<th>(%) n=9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>1</td>
<td>11.11%</td>
</tr>
<tr>
<td>Symptomatic</td>
<td>8</td>
<td>88.88%</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>7</td>
<td>77.77%</td>
</tr>
<tr>
<td>Jaundice</td>
<td>2</td>
<td>22.22%</td>
</tr>
<tr>
<td>Abdominal distension</td>
<td>5</td>
<td>55.55%</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>6</td>
<td>66.66%</td>
</tr>
</tbody>
</table>

Table (7): Signs of cases of cryptosporidiosis.

<table>
<thead>
<tr>
<th>Signs of cases</th>
<th>Numbers</th>
<th>(%) n=8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender abdomen</td>
<td>7</td>
<td>87.5%</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>5</td>
<td>62.5%</td>
</tr>
<tr>
<td>Dehydration</td>
<td>6</td>
<td>75%</td>
</tr>
<tr>
<td>Ascites</td>
<td>3</td>
<td>37.5%</td>
</tr>
</tbody>
</table>
DISCUSSION

In the present study, by using MZN stain method, DFA assay and ELISA technique, a total of 15 (18.29%), 17 (20.73%) and 18 (21.95%) positive samples were detected respectively. DFA assay and ELISA technique showed statistically highly significant relation with MZN method as a gold standard test. These results agreed with that reported by Parghi et al. (2014) who found that 17.7% were positive for Cryptosporidium by stool ELISA, and Abdel Messeh et al. (2005) who detect Cryptosporidium infection in 17% of diarrheic children. Similar to the present study, there was a study by Aghamolaie et al. (2014) who showed statistically highly significant relations between the results of MZN method and DFA assay and detected Cryptosporidium infection in 1.2% and 1.1% respectively. But the results was different in a study by Yilmaz et al. (2008) who recorded that only 1.95% of 2000 children were positive on microscopy of acid fast stained smears and 4.9% were positive by ELISA. Moreover, EL-Shazly et al. (2002) diagnosed C. parvum in stool samples by MZN stain as 5.3% and ELISA as 8.3%. On other hand, the current results were lower than that reported by AL-Shamiri et al. (2010) in Yemen who recorded that 34.7% were positive by microscopy and 26.1% were positive by ELISA. In general, surveys indicated prevalence rates of Cryptosporidium spp. infection ranged from less than 1% to more than 30% worldwide. Most of these variations may be attributed to geographic differences, demographic, temporal, and methodological factors (Casemore et al., 1985).

According to the results in this study, the sensitivity, specificity, and positive and negative predictive values of DFA assay compared with the microscopic method for detection of the Cryptosporidium spp. were 100%, 97%, 88%, and 100%, respectively, and for ELISA were 100%, 95.5%, 83.3%, and 100%, respectively. There were other studies more or less similar to these results. A study by Parghi et al. (2014) reported that sensitivity and specificity of stool ELISA for detection of Cryptosporidium compared with modified AF staining was 100% and 92.7%, respectively. Other study from southern India by Jayalakshmi et al. (2008) had reported sensitivity and specificity of ELISA to be 90.9% and 98.7%, respectively. Also, there was a study by Ungar (1990) who reported that the sensitivity of the ELISA was 82.3%, and specificity was 96.7%. He stated that the ELISA may have an advantage over microscopy especially in large scale epidemiological studies, as all microscopic diagnosis rely on direct visualization and morphologic recognition of small-sized oocysts which may be scant in number, intermittently shed, or inconsistently stained. However, the value of microscopy in detecting other parasites in immunocompromised patients cannot be overlooked. Regarding DFA assay, the study by Aghamolaie et al. (2014) detected that the sensitivity, specificity, positive and negative predictive values for DFA assay were 87.5, 100, 100, and 96%, respectively. The sensitivity and specificity of DFA test have been reported to be 96 to 100% and 99.8 to 100%, respectively for Cryptosporidium (Garcia et al., 1992, Kehl et al., 1995,
Zimmerman et al., 1995 and Garcia et al., 1997). This test had a sensitivity equal to or greater than that of traditional examination of permanent smears prepared from concentrated stool specimens for Cryptosporidium (Kehl et al., 1995).

Regarding gender variation in the present study, cryptosporidiosis was found to be relatively higher in females than males, but the difference was statistically insignificant with all used tests. This result varied with Park et al. (2006) who recorded 1.9% in males and 1.2% in females but also with statistically insignificant difference. Also, Al-Shamiri et al. (2010) recorded that cryptosporidiosis was 36.2% in males and 32.7% in females. Higher prevalence in males could be attributed to higher sample size of males in the study, or due to the presence of males in outdoor areas as farms and contact with animals more than females which increase the risk of parasite transmission. However, other studies suggested that distribution of cryptosporidiosis cases by sex indicates that males and females appear to be equally susceptible to infection (Fayer and Ungar, 1986).

As regard the age of studied groups, cryptosporidiosis was recorded in the present study to be relatively higher in the age group up to 5 years old by MZN, DFA and coproantigen detection. These results agreed with a study by Abou El-Magd and Abou-Shady (1986), who stated that cryptosporidiosis was more common in the age of 2-12 years old. Also, Al-Shamiri et al. (2010) detected the highest rate of infection 40.3%, in preschool age group between 2-6 years. In Korea also, the peak of infection was in children aged 1-5 years (Casemore, 1990). Thus, at age of 2 to 6 years, children may be more exposed to the infection by Cryptosporidium spp. because they have lack of the knowledge about the good food and water. They eat without washing their hands, play in soil and sewage water, exposed to more fecal/oral contact or through contaminated food or water, or may be attributed to their weak immune responses (Mirzaei, 2007). A small secondary peak in laboratory-confirmed incidence has also been described in young adults aged 20-40 years which has been commonly attributed to familial contact with children or occupational exposure (Casemore, 1988). Clinical infection is less common after the age of 40 years, and there is apparently no evidence of elevated incidence rates in the elderly (Casemore, 1988 and 1990). However, incidence in adults may increase dramatically during waterborne outbreaks of cryptosporidiosis, and, therefore, may provide an early indication of the likely route of transmission of Cryptosporidium to the community (Casemore, 1995).

Certad et al. (2005) reported that 34% of Cryptosporidium infected patients had mixed infections with other parasites, mostly with B. hominis in 19% and S. stercoralis in 7%. Concurrent infection with Cryptosporidium spp. and a variety of other enteric microorganism, including Giardia and Campylobacter has also been reported (Casemore, 1987). Descriptions of mixed enteric infections may reflect overlapping sequential infections with other enteropathogens or common sources of infection and mode of transmission with Cryptosporidium spp. co-infection
with *Giardia* has been noted. These suggest the possibility of contaminated water or food as a common source of exposure, as well as person-to-person transmission (*Isaac-renton et al., 1987*).

In the present study, diarrhea were recorded in 66.66% of the cases. This result was lower than that reported by *Hassan et al. (1995)* who recorded that 91.7% of children suffering from diarrhea were positive for *Cryptosporidium* coproantigen by ELISA. On the other side, it was higher than that reported by *Al-Shamiri et al. (2010)* who recorded that only 38.45% of children infected by *Cryptosporidium* spp. had diarrhea. Moreover, Egyptian study revealed that only 13.9% of children were with diarrhea (*Rizk and Soleiman, 2001*). According to *Abdel Messeh et al. (2005)*, vomiting and persistent diarrhea are important clinical findings associated with *Cryptosporidium* spp. and the need for hospitalization.

**CONCLUSION**

Modified Ziehl–Neelsen staining remained the gold standard for the detection of *Cryptosporidium* spp., but it may leave some oocysts unstained. So, the immunofluorescence assays were the methods of choice for greatest sensitivity and specificity especially when oocyst numbers in stool specimens were low.

**REFERENCES**


30. Rizk H and Soliman M (2001): Coccidiosis among malnourished children in Mansoura,


أحمد عبد العزيز عز الدين البحرى
قسم الطفيليات – كلية طب الأزهر

خليفة البحث: تشتمل طرق إكتشاف طفيل الكريبتوسبورديوم على الصبغات المستضيضة والسلبية.

وقد أوضحت هذه الطرق حساسيات عالية ولكنها قد تترك بعض البويضات غير مصبوبة.

هدف الدراسة: تقييم طريقة إكتشاف طفيل الكريبتوسبورديوم باستخدام الأحجام المضادة

الفلوريينية وطريقة تحديد الأنتيجينات باستخدام اختبار الإليزا مقارنة بالفحص الميكروسكوبى لعينات

البراز المصبوبة بصبغة زيل نيلسون المعطى.

الأشخاص وموجهة البحث: أجريت هذه الدراسة على أثناين وثمانين مريضاً مصابين بنقص المناعة

و يعانون من وجود الإسهال الحاد أو المتزمن. تم اختيار الحالات من عيادات طب الأطفال والأورام

وأمراض الكلى في مستشفى جامعة الأزهر في الفترة من أغسطس 2013 إلى مايو 2014. تم أخذ

التاريخ المرضي والفحص السريري لجميع الحالات كما تم فحص مختبرى لعينات براز منهم عن

طريق الكريبتوسبورديوم للعينات المصبوبة بصبغة زيل نيلسون المعطى وتحديد الأنتيجينات في

البراز باستخدام اختبار الإليزا وطريقة الأحجام المضادة الفلوريينية المباشرة لتشخيص طفيل

الكريبتوسبورديوم.

النتائج: بنيت النتيجة أن 15 (18.29%) حالة كانت إيجابية لطفيل الكريبتوسبورديوم باستخدام

الفحص الميكروسكوبى بطريقة صبغة زيل نيلسون المعطى و17 (20.73%) حالة إيجابية باستخدام

طريقة الأحجام المضادة الفلوريينية المباشرة بينما اختبار الإليزا بين (21.95%) 18 حالة

مصابون بطفيل الكريبتوسبورديوم. وهناك علاقة ذات دلالة إحصائية عالية بين كل من طريقة

الأحجام المضادة الفلوريينية المباشرة وطريقة اختبار الإليزا مقارنة بالفحص الميكروسكوبى للعينات

المصبوبة بزيل نيلسون المعطى. كما بنيت النتيجة أن الحساسية، والخصوصية، والقيمة الإيجابية

والسلبية التنبيهية لطريقة الأحجام المضادة الفلوريينية كانت 100 ، 97 ، 98.2 و100% على

النتيجة، وكانت لإختبار الإليزا 100، 95.5 و100% على التوالي، مقارنة مع طريقة الفحص

الميكروسكوبى للعينات المصبوبة بصبغة زيل نيلسون المعطى كاختبار امثا للكشف عن

الكريبتوسبورديوم.

الاستنتاج: أوضحت الدراسة أن طريقة الفحص الميكروسكوبى للعينات المصبوبة بصبغة زيل نيلس

المعطى تبقى الأفضل لتشخيص طفيل الكريبتوسبورديوم ولكن لأنها ربما تترك بويضات الطفيل غير

مصبوبة فستكون طريقة الأحجام المضادة الفلوريينية المباشرة هي الأعلى حساسية وخصوصية

خصوصًا عندما يكون عدد البويضات في عينات البراز قليل.