STUDIES ON INTESTINAL PROTOZOA OF POULTRY IN GHARBIA GOVERNORATE

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A B S T R A C T

The present study was conducted to detect the prevalence and the seasonal dynamic of protozoa infection among domesticated poultry (chicken, turkey, duck, geese, and pigeon). The detected protozoa were Eimeria spp. in fowl, pigeon and duck and Cryptosporidium spp. The current study revealed that out of 1486 examined birds, 636 (42.8%) were infected with intestinal protozoa. The incidence rate was 401 (62.3%) in fowls, 149 (46.2%) in pigeons, 96 (10.9%) in turkeys, 74 (18.3%) in ducks, and 3 (8.3%) in geese. The seasonal dynamic revealed that the highest incidence of Eimeria and Cryptosporidium in all examined bird species was in Winter (61.5%, 15.4%), (42%, 3.6%), (14.1%, 44.2%), (15.7%) and (30%) for (fowl, pigeon, duck, turkey, and geese respectively) while the lowest rate in Eimeria spp and Cryptosporidium in fowl was in Summer (36.3%) and Spring (8.3%) respectively. The lowest rate of protozoa in pigeons was in spring (20.4, 2.6%) and Summer (3.2%) in ducks. Cryptosporidium had the lowest rate in autumn in turkey (4.4%).

Key words: poultry protozoa, Eimeria, Cryptosporidium

1. INTRODUCTION

Avian coccidiosis is a disease caused by Eimeria spp. and considered as one of the most extensive and common diseases in spite of advances in chemotherapy, management, nutrition and genetics [1]. It causes not only economically important changes such as impaired growth, poor food utilization and depigmentation but can also produce change in the metabolism, tissue composition and dietary requirement, all of which impact adversely an effect on poultry production [2]. Cryptosporidium species are coccidial parasites that inhabit the microvillus border of the epithelial cells of respiratory and intestinal tract they were associated with respiratory manifestation and diarrhea in birds [3]. Avian intestinal infection have been documented for chicken [4], turkey [5], duck [6], geese [7] and pigeon [8].

2. MATERIALS AND METHODS

2.1. Collection of samples for intestinal protozoa.

Intestinal content of (643 chickens, 322 pigeons, 82 turkeys, 403 ducks, and 36 geese) of different ages, sexes, and breeds were collected from poultry markets, private poultry farms, and poultry slaughterhouses during the period from January 2012 to January 2013 in Gharbia Governorate and transferred to the laboratory of Fac. Vet. Med., Moshtohor, Benha University for protozoological examination.

2.2. Examination of fecal samples for the presence of intestinal protozoa

2.2.1. Direct microscopic examination [9]

A pin head drop of intestinal contents was put on a microscopic slide, mixed well with a drop of saline 0.9% by the aid of a wooden stick, covered with a cover glass slip and examined under high power X40 of light microscopy.
microscope for detection of any oocysts in feces.

2.2.2. Concentration floatation technique.
(By using of Sheather's sugar solution. [9]
Each fecal sample was concentrated with Sheather's sugar solution and centrifuged at 200 rpm. for 10-15 minutes. The float was examined by mixing it thoroughly with a drop of tap water and distributed on a clean glass slide to form a thin film, covered by cover glass slip and examined under high magnification power X40.

2.2.3. Sporulation of coccidian oocyst: [10]
In clean glass Petri dishes, the positive faecal samples for Eimeria species were mixed with 2.5% potassium dichromate solution at the depth of 3-5 mm. Petri dishes were covered and left to stand at room temperature. They were daily aerated and examined to follow up the process of sporulation. The identification of Eimeria spp. was according to [9]

2.2.4. Counting of oocyst of Eimeria species [11]
Fill a graduated tube at the 14 level with 0.1% sodium hydroxide, add feces until level rise to15ml and mix well. Take off 0.15ml from the suspension and transfer it to a slide, put a cover and count the oocyst. The numbers of oocysts per gram faeces were calculated by multiplying the number of oocysts by 100. The low infection was < 200 oocyst/ gm, medium infection was 200-500 oocysts/ gm and sever infection was > 500 oocysts/ gm

2.2.5. Staining of Cryptosporidial oocysts
Safranin-methylen blue staining technique [12]
Thin smear from infected faeces was prepared by adding a drop of tap water on a microscopic slide, air dried, fixed briefly by one pass through the Bunsen flame. The smears were fixed in 3% pure hydrochloric acid HCL for 3-5 minutes, washed with tap water and stained with 1% aqueous safranin, heated thoroughly, preferably until boiling occurred, more stain was added and heating continued if necessary. The slides were washed with tap water, counter staining by using of methylene blue for 30 seconds, washed with tap water, air dried and examined under oil immersion lens where Cryptosporidium oocyst appeared orange against bluish background. Giemsa stain [13]. The semidried smears were fixed in methanol for 10 minutes, stained with 10% buffered Giemsa for 30 minutes, then rinsed in tap water, air dried and examined. The oocysts appeared as blue bodies with dark granules inside it.

3. RESULTS
1486 birds (643 chickens, 322 pigeons, 82 turkeys, 403 ducks and 36 geese) were examined for enteric protozoa. Table 1 revealed that (42.8%) of examined birds had enteric protozoa. The detected protozoa were Eimeria species, which were found in 453 birds (30.5%) (325 chickens, 110 pigeons and 18 ducks) and absent in turkey and geese. Cryptosporidium species was found in 183 birds (12.3%) (76 chickens, 39 pigeons, 9 turkey, 56 ducks and 3 geese).
Table 1 and 2) showed that chickens were mostly infected with Eimeria species (50.5%), followed by pigeon (34.2%) and ducks (4.5%) while Turkey and geese were free from infection. The single infection was recorded in 277 (43.1%) chickens, 72 (22.4%) pigeons and 16 (4%) ducks. The detected species of Eimeria were E.tenella, E. acervulina, E.mitis, E.praeox and E.necatrix in chicken, E.columbae and E.labbeana in pigeon and E. battakhi, E. danailova, E. schachdagica in ducks.
Table 1) displayed that the incidence of Cryptosporidial infection was high in ducks (13.8%) followed by pigeon (12.1%), chicken (11.8%) turkey (11%) and geese (8.3%).
Table 2) showed that the highest incidence of Eimeria and Cryptosporidium in all examined bird species was in Winter (61.5%, 15.4%), (42%, 3.6%), (14.1%, 44.2%), (15.7%) and (30%) for fowl, pigeon, duck, turkey and geese respectively.
while the lowest rate in *Eimeria* spp and *Cryptosporidium* in fowl was in Summer (36.3%) and Spring (8.3%) respectively. The lowest rate of protozoa in pigeons was in spring (20.4, 2.6%). *Eimeria* and *Cryptosporidium* showed fewer incidences in autumn (2.4%) and summer (3.2%) in ducks. *Cryptosporidium* had lowest rate in autumn in turkey (4.4%).

Table (1) incidence of enteric protozoa among examined birds

<table>
<thead>
<tr>
<th></th>
<th>No. of examined birds</th>
<th>No. of infected birds with <em>Eimeria</em> spp.</th>
<th>%</th>
<th>No. of infected birds with <em>Cryptosporidium</em> spp.</th>
<th>%</th>
<th>total of protozoa</th>
<th>%</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Crypt. bailleyi</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Crypt. meleagrides</td>
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<td></td>
</tr>
<tr>
<td>chicken</td>
<td>643</td>
<td>325</td>
<td>50.5</td>
<td>76</td>
<td></td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>pigeon</td>
<td>322</td>
<td>110</td>
<td>34.2</td>
<td>39</td>
<td></td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>turkey</td>
<td>82</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Ducks</td>
<td>403</td>
<td>18</td>
<td>4.5</td>
<td>56</td>
<td></td>
<td>13.8</td>
<td></td>
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<tr>
<td>Geese</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td></td>
<td>8.3</td>
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<tr>
<td>Total</td>
<td>1486</td>
<td>453</td>
<td>30.5</td>
<td>183</td>
<td></td>
<td>12.3</td>
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Table (2) incidence of *Eimeria* species among birds

<table>
<thead>
<tr>
<th></th>
<th>species of Eimeria</th>
<th>Single infection</th>
<th>%</th>
<th>Mixed infection</th>
<th>%</th>
<th>Total</th>
<th>%</th>
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<tr>
<td>Chicken (643)</td>
<td>E.acervulina</td>
<td>50</td>
<td>7.8</td>
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<td></td>
<td>E.praeox</td>
<td>40</td>
<td>6.2</td>
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<td></td>
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<tr>
<td></td>
<td>E.tenella</td>
<td>66</td>
<td>10.3</td>
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<td></td>
<td>E.necatrix</td>
<td>63</td>
<td>9.7</td>
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<tr>
<td></td>
<td>E.mitilis</td>
<td>58</td>
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<td>277</td>
<td>43.1</td>
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<tr>
<td>Pigeons (322)</td>
<td>E.labbeana</td>
<td>35</td>
<td>10.8</td>
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<td></td>
<td>E.columbea</td>
<td>37</td>
<td>11.4</td>
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<td></td>
<td></td>
<td>72</td>
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<td></td>
<td></td>
<td>3</td>
<td>1.7</td>
<td></td>
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<tr>
<td>Ducks (403)</td>
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<td>1</td>
<td></td>
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<td></td>
<td>E.danilova</td>
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<td></td>
<td>E.schachadagica</td>
<td>5</td>
<td>1.2</td>
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<td></td>
<td></td>
<td>16</td>
<td>4</td>
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<tr>
<td>Total (1368)</td>
<td></td>
<td>365</td>
<td>26.7</td>
<td></td>
<td></td>
<td>453</td>
<td>33.1</td>
</tr>
</tbody>
</table>
4. DISCUSSION

325 fowls, 110 pigeons and 18 ducks were found infected with Eimeria spp. at incidence of 50.5%, 34.2% and 4.5% respectively with general prevalence 30.5% while turkey and geese were free from infection. These results were relatively agreed with those of [14] in the general prevalence (23.5%), but she did not found Eimeria in ducks. Fowl prevalence also near to that recorded by [15], [14] in Egypt and [16] in Nigeria which were 55.7%, 43.9% and 52.9%. On the other hand it was higher than that mentioned by [17] (43.9%), and (30%) in Egypt [18], While the present result was lower than those recorded by [19] and [20] in Saudi Arabia, which were 94% and 80% respectively. The present incidence of Eimeria in pigeons (34.2%) was relatively near to that of [14] in Egypt (28.7%). It was relatively higher than that recorded by [21] in Egypt (23.4%). Higher incidence of Eimeria infection in pigeon were recorded by [22] (77.5%) in Egypt, [23] in Slovenia (71.9%), [24] in Poland (56.4%) and [25] in Egypt (61.36%).

Dealing with Eimeria species in ducks (Anas domesticus) E.battakhi (1.7%) , E. danailova (1%), E.schachdagica (1.2%) with over all prevalence 4.5% where it was recorded for the frist time in Egypt. Little literature about Eimeria spp. in ducks but [26] in China agreed with our types only at E.battakhi but [27] in Ceskoslovenska agreed with us in E.danailov while [28] in French recorded different species called E. mulardi. Cryptosporidium spp.was found in all examined birds species (12.3%) at incidences 11.8%, 12.1%, 11%, 13.8% and 8.3% for chickens, pigeons, turkeys, duck and geese respectively. Same results were reported by [14] in Egypt for general incidence (13.5%), and for chicken (12.6%), pigeons (13.3%) and geese (9.3%) but slightly lower for turkey (17.8%) and duck (24.2%). Also [29] in Egypt, [30], and [31] in China found similar results for chicken were 9.5%, 10.38% and 10.6% respectively.

Concerning with seasonal dynamics of protozoa in domestic birds the results agreed with [32] who reported that the highest prevalence of coccidiosis in the examined birds was in rainy season, [18] in Egypt reported the peak of fowl Eimeria was in winter and [33] in Egypt noticed the highest rate of chicken coccidiosis was in winter while our results differ than that reported previously [34] in Nigeria who reported the highest prevalence of coccidiosis disease was in summer. Our results in Cryptosporidium differ with [31] who reported the highest prevalence of Cryptosporidium infection in chicken was in spring.

5. REFERENCES

27. Pascalon-Pekelniczky, A., Chauve, C.M., Gauthey, M. 1994 Experimental infection of the mule duck


