

Investigation study of some parasites infected domestic pigeon (*Columba livia domestica*) in Al-Dewaniya city

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Abstract: The objectives of present study were to investigate some types of parasites that infects pigeon and study the histopathological changes of the intestine and liver from parasitized pigeons, 95 pigeon were examined, obtained from local market of Al-Dewaniya city, blood samples were examined for blood parasites, oral cavity and intestine examined for trichomonas and helminthes respectively, 28/95(29.47%) with blood parasites (*Haemoproteus spp*), 63 pigeon of 95(66.31%) were parasitized with tape worms 19(20%) belongs to *Cotugnia spp*, and 44 (46.31%) belongs to *Raillietina spp*, 37/95(38.94%) with nematodes (*Ascaridia spp*), 10/95(10.52%) with *Trichomonas*, and 7/95(7.36%) apparently clean, we recorded also many birdsholds more than one parasite.

Histopathological study shows there are ulceration and sloughing of epithelial lining of intestine mucosa, distraction and degeneration of villi. Also there are desquamation of epithelium, destruction of secretory glands, infiltration of inflammatory cells and atrophy of villi. Liver of pigeon show sever necrosis and infiltration of inflammatory cells also there is vaculation of hepatocytes, congestion, hyperplasia of hepatocytes and some hepatocytes undergone fatty changes.

Our results showed that there are a serious problem in the domesticated pigeons we conclude the problem is need more study and not easy to solved and need more hard work to be minimized

Key word: pigeon parasites, AlDewaniya, domestic pigeon

I. Introduction

Pigeon are worldwide free living species which found of ancient time, (Sari *et al.*, 2008) and are most widely distributed among hopy in the world including Iraq, in some countries pigeon are used for human food as well as ornamental purposes, also feral pigeon used as a bioindicator of chemical pollution (Klein *et al.*, 2008, Nam *et al.*, 2004), In Iraq pigeons are kept solely for ornamental purposes, although pigeons are considered as a serious health problem for man (Vazquez *et al.*, 2010, Ritchie *et al.*, 1994, Gonzalez-Acuna *et al.*, 2007) and livestock including poultry (Weber, 1979), it may carry such many infectious agents or pathogens as *Campylobacter* and *Chlamydia psittaci* (Vazquez *et al.*, 2010) and *Listeria Salmonella*, *Asperigillus* and Newcastle disease (Al-Jumaily *et al.*, 1989, Ritchie *et al.*, 1994, Barnek *et al.*, 2003, Haag-Wackernagel and Moch 2004) and *Microsporidia*, including *Enterocytozoon* and *Encephalitozoon* (Haro *et al.*, 2005), and Nematodes such as *Filaria* (Pizarro *et al.*, 1994) Humans or may be other poultry may be infected by dry fecal dust, (Marques *et al.*, 2007), this preliminary work was carried out with the aim of determining the presence of the most prevalent parasites in domestic pigeon of Al-Dewaniya city.

II. Material and Methods

A sample of 95 pigeons (*Columba livia domestica*) were randomly selected from local market at Al-Dewaniya city to be examined in this study, the specimens consist of 42 adult females and 53 adult males, It does not seem diseased (apparently healthy), the period of study between March to November 2010.

Blood samples

Blood was obtained from wing (brachial) vein or sometimes from the heart of each bird and used for the preparation of blood smear, leave to dried and fixed in absolute methanol and stained with 5-10% Giemsa stain (PH.7.2) for detection the presence of any blood parasites.

Buccal cavity

Fresh scraping from oral mucosa with pale yellow lesion were taken to clarified the presence of *Trichomonas gallinae*, the identification is easy and not so difficult, it done by preparation of wet mount and confirmed by the motile trophozoites with pear-shaped parasite. (McDougald, 2003)

Evisceration

The evisceration process include complete separation of digestive tract from esophagus to vent was investigated of any presence of ant type of worms ,when it found ,the worms cleaned in saline and the identification done by dissecting microscope then preserved in 70% ethanol .(Soulsby, 1986)

Histopathology

For histopathology ,pieces of 1-2cm³ from intestine and liver taken then kept in normal buffered formalin for fixation , processed routinely in histokinette , cut at 5mm thickness by microtome (Jony 4291, west Germany) and stained with Haematoxylin &Eosin stain then examined under light microscope.(Luna 1968)

III. Results and Discussion

Healthy pigeons without any significant size difference are chosen, Five form of parasites were identified in the pigeon under examination of our study (Table. 1). Our results revealed that this 5 form of parasites are belong to many species of Cestode ,Nematode,blood parasite and GIT protozoa . The prevalence percentage of infection was 28(29.47%) , 10(10.52%) , 30(31.57%), 44(46.31%) , 37(38.94%) for *Haemoproteus spp.* , *Trichomonas*, *Cotugnia spp*, *Raillietina spp.* , *Ascaridia spp.* respectively , however there is some differences between adult female and adult male , also many birds not just harbor one parasite but others have 2 or more.

Table 1. showed the type of parasites and infection rate

Parasite spp.	No. of infected birds	Total %	Male	Female
			No. and % of infected birds	No. and % of infected birds
<i>Hemoproteus</i>	28/95	(29.47%)	10/28(35.7%)	18/28(64.3%)
<i>Trichomonas</i>	10/95	(10.52%)	4/10(40%)	6/10(60%)
<i>Cotugina spp.</i>	19/95	(20 %)	8/19(42.1%)	11/19(57.9%)
<i>Raillietina spp.</i>	44/95	(46.31%)	21/44(47.7%)	23/44(52.3%)
<i>Ascaridia spp.</i>	37/95	(38.94%)	17/37(46%)	20/37(54%)

With respect to blood parasite (Table.1) showed higher percentage in the female than male, the examined blood smear showed that the cytoplasm of RBCs, contains variable amounts of a golden–brown granular pigment gametocyte, Fig. 1, as mentioned by (Bennett et al., 1993,Ritchie et al.,1994) blood parasites it seems to be belong to the *Haemoproteus spp.*.two spp. wererecorded by(Lund, 1972)*H. columbae* and *H. saccharovi* in pigeons and doves.

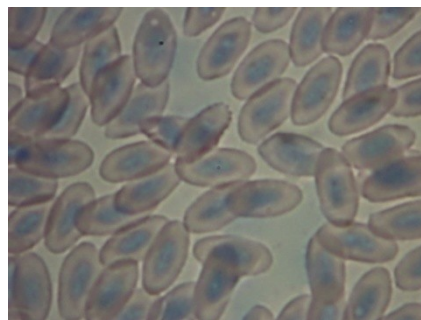


Fig.1Goleden brown bodies

Haemoproteus spp it was the first blood parasites recorded in the pigeon in Mousl province(north of Iraq) (Al-Janaby et al.,1980),while it was first time recorded in Al-Diwaniya city(middle Euphrates) according to our knowledge, with total infection rate of 29.47% ,this parasite have been repeatedly identified in many birds worldwide with different rate of infection ,18.8 % (Senlik et al.,2005) 43.2%(Gulnaber et al.,2002), it clearly that the infection rate of female were higher 64.3% than male 35.7%, while (Senlik et al., 2005)found no difference between male and female ,our result in agreement with (Earle and Little,1993),but in contrast with Al-Barwari and Saeed,2012 who they found that ,male pigeon have more prone than female to infection , the infection rate of blood parasites may be depending on many factors related to the variation in the incidence or prevalence like health status of bird , sex, age, feeding and feeding habitats, season and the presence of transmitters (Senlik et al., 2005),beside that we can say that the results variation influenced by vector abundance.

Trichomonas is unicellular organism ,motile with flagella ,have pear shaped ,Trichomonads multiplied locally in secretions, *T. gallinae* invade the mucosal surface of the buccal cavity, sinuses, pharynx, esophagus, and crop

(McDougald, 2003), the total infection rate was 10.52% ,female with 60% of infection rate ,while male with 40% as shown in the (Table.1)

The infection rate of *T. gallinae* was the lowest among all parasites identified from sampled pigeon ,the reason may be the selective procedure (only birds with obvious lesion),this result is with agreement of study (Tasca et al., 1999)but differ from (Martinez-Moreno et al.,1989)

Two species of tape worms were found, *Cotugnia spp.* and *Raillietina spp.* Which both belong to the **Davaineidae** family ,They were recovered from small intestine anchored to the mucosa with thickened wall and small scattered nodules, the birds also suffered from enlargement of heart and liver, some heavy infected birds showed semi-necrotic membrane we believed this lesion is results from another secondary bacterial infection in the intestine due to destruction of intestinal epithelium by parasites, hemorrhage have been noticed in others may be due to irritation of heavy infection,there is differences were found between male and female in the degree of parasitism, with respect to *Cotugnia spp* this study showed that the infection rate of female was higher 57.9% than male 42.1% with total rate 20% ,while Al Jabri (2006) found the infection rate of domesticated pigeon with *Cotugna intermedi* was 13%, according to (Al-Bayati 2011) the prevalence with *Cotugna intermetia* in Diyala city (middle of Iraq) was found to be 21%, with regard to *Raillietina spp.* which recorded previously in Iraq by (AlHubaity and AlHabib 1979, Zangana ,1982, Sawada et al.,1990 and AlBarwari and Saeed , 2012), Al-Bayati (2011) recorded 36.5% infected pigeon with *Raillietina microcantha*, and AlHubaity and AlHabib (1979) recorded that *R. tetragona* in 18.5% of domestic fowls from the Mosul district, but our study showed that the total rate was 46.31%, while the infection rate of female was 52.3% ,while male 47.7%, we need more investigation and more samples to confirm this fact and to explain the causes for high prevalence recorded here, although (Foronda et al.,2004) they said *Raillietina* is one of the most prevalent helminthes in pigeon ,this information may be highlighted the dangerous role of pigeon to play in poultry and may be human health , **the total rate of cestodes in our study was 66.3%**. The other investigations demonstrated that the prevalence with cestodes in pigeons (*Columba livia*) was found to be 73% (Al-Bayati, 2011), and in Al-Basrah city (south of Iraq) (67.4%) (Mustafa, 1984). These results is higher than the result recorded in Nineva (mousl) and some areas of Erbil and Duhok provinces with (0.66%) infection percent (Zangana ,1982).



Fig.2 Raillietina

We also recorded a worms belong to *Ascaridia spp.* (Nematodes) with no gross lesion ,although there is differences between male 46% and female 54% in the infection rate with total of 38.94%, Zangana (1982) from the first researchers who described the *Ascaridia galli* in pigeon, He recorded 30% infection rate in the pigeon of Mousl province according to our study in the Al- Diwaniya city it was higher with low burden may be for that the birds seems in good physical condition with no gross lesion, but again such birds considers as potential source of poultry infection .

It's clear that, only 7 birds apparently clean from parasitism with percentage of 7.36% this situation revealed a presence of serious problem in domesticated pigeons, although infected birds appear as healthy birds with normal body size may be due to the heavy of infection, rather than prevalence ,a high percentage of parasitized pigeon a problem must look after and more samples needs for a confidence statistical analysis .

This high percentage of infected pigeons, this fact may shed light on the role of pigeons in the perpetuation or continuation of the different pathological agents and may lead to infect more and more number of pigeons that contact with infected ones . Finally a little information about the reality of the infection prevalence, misdiagnosis and errors in treatment, Poor sanitation, unsuitable condition, crowding ,heavy presence of vectors and low value food , factors can related with continuity of infection rate in the pigeon, we must concentrate on the education of the owners

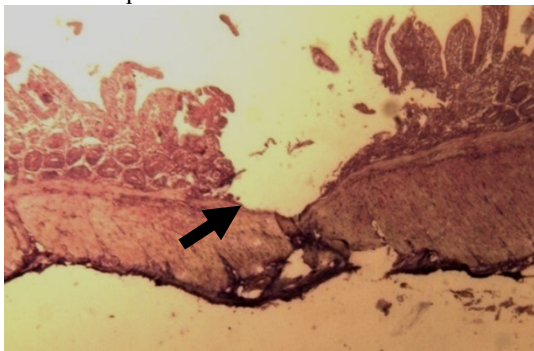
The histopathology of the infected intestine with tape worm described as follows, Pathologically the study showed there are ulceration and sloughing of epithelial layer of intestinal mucosa (figure 1 and 2), destruction and degeneration of villi (figure 3) and desquamation of epithelium (figure 4 and 5), These results

are agreed with (Samad, et al., 1986), also there are destruction of secretory glands and infiltration of inflammatory cells (figure 6 & 7) and atrophy of villi (figure 8)

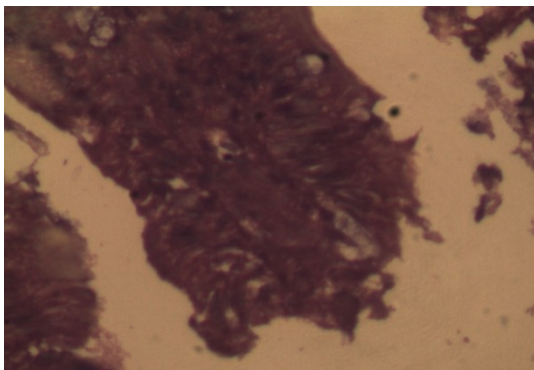
These observations agree with (Padhi, et al., 1986) who reported similar pathological lesions in gut of Desi fowls that infected with *R. echinobothrida*, who showed desquamation of epithelium, congestion, cellular infiltration, hemorrhagic exudates and desquamation of sub-mucosal glands especially in duodenum. These changes may be linked to the migration of the larvae during the tissue phase of the life cycle. Also the atrophy of villi and infiltration of inflammatory cells especially lymphocytes and eosinophils agreed with Al Jabri (2006). These changes are due to contact of villi with parasite and lead to atrophy and malabsorption.

The report showed that the liver of infected birds had severe necrosis and infiltration of inflammatory cells (figure 8 & 9), vacuolation of hepatocytes and congestion (figure 10 & 11) fatty degeneration and areas of coagulation necrosis of the hepatic cells most predominantly at the portal areas (figure 12) this agreed with (Bahrami et al., 2013) they report there were mononuclear and polymorphonuclear cellular infiltrations in the necrotized areas with fatty degeneration. The liver had congested blood vessels and congested sinusoids.

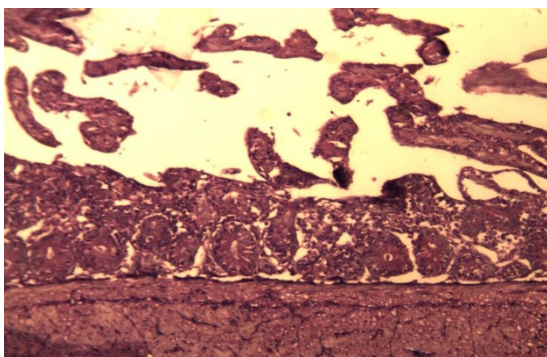
These vital organs of the body, such effects of them, could lead to high mortality, or could lead to secondary infections. It is hereby recommended that further research be conducted to ascertain any histopathological effects of tape worms or nematode infection on the vital organs, in support of the present study.



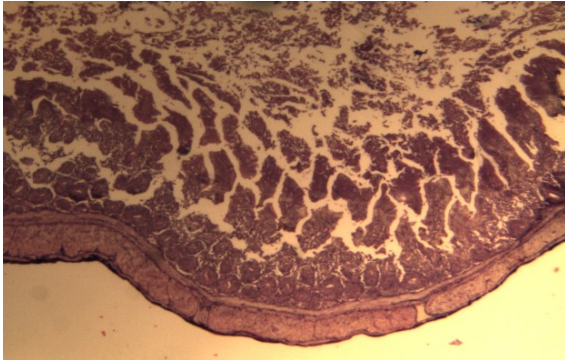
Figure(1): Histopathological section of intestine of pigeon show the mucosa ulceration and sloughing of epithelial lining of villi and degeneration (black arrow) (4X H&E)



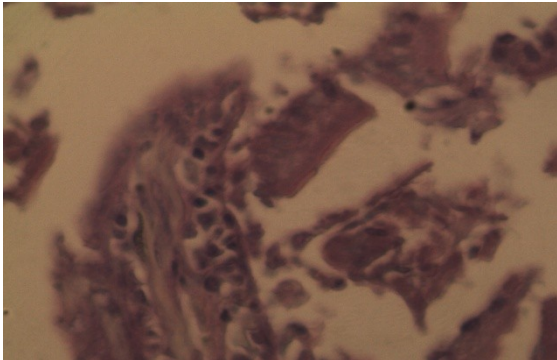
Figure(2): Histopathological section of intestine of pigeon show the mucosa ulceration and sloughing of epithelial lining of villi and degeneration. (100X H&E)



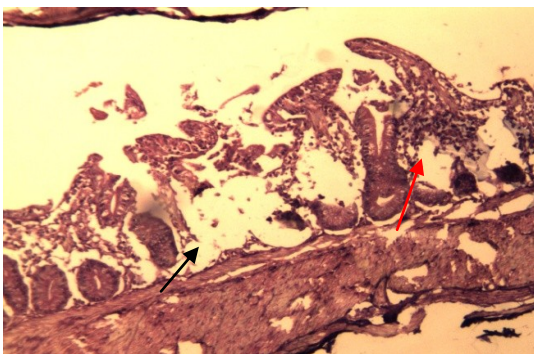
Figure(3): Histopathological section of intestine of pigeon show distraction and degeneration of villi (10X H&E)



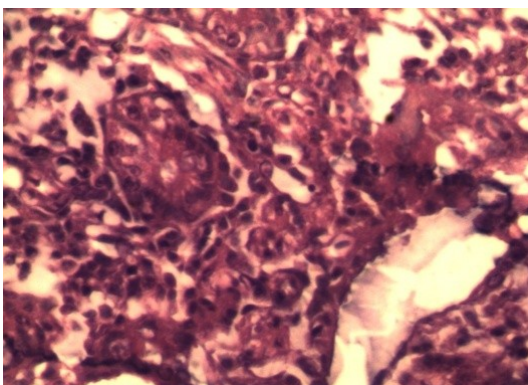
Figure(4): Histopathological section of intestine of pigeon show desquamation of epithelium(4X H&E).



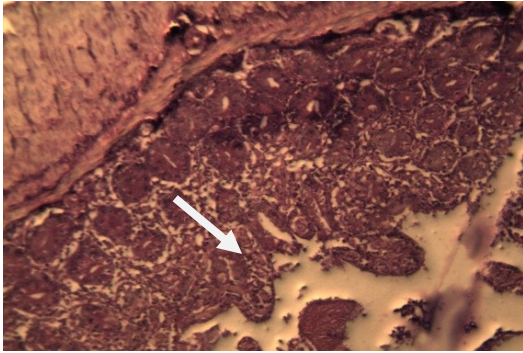
Figure(5): Histopathological section of intestine of pigeon show desquamation of epithelium(100XH&E)



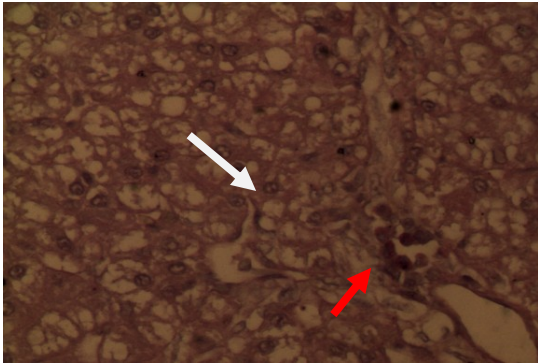
Figure(6): Histopathological section of intestine of pigeon show destruction of secretory glands(black arrow) and infiltration of inflammatory cells(red arrow) (10X H&E)



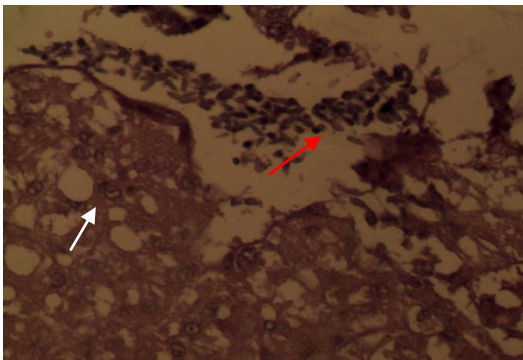
Figure(7): Histopathological section of intestine of pigeon show infiltration of inflammatory cell(100X H&E)



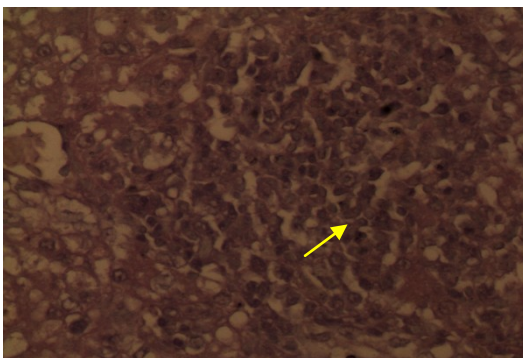
Figure(8): Histopathological section of intestine of pigeon show atrophy of villi (white arrow)(10X H&E)



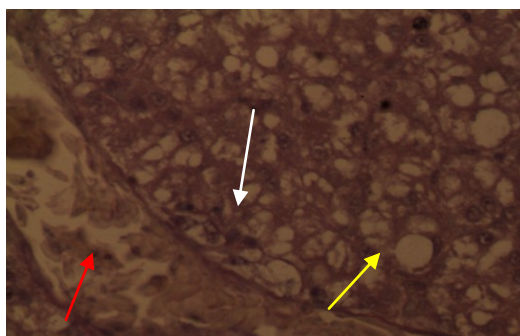
Figure(9): Histopathological section of liver of pigeon show sever necrosis(white arrow)and infiltration of inflammatory cells(red arrow) (40X H&E)



Figure(10): Histopathological section of liver pigeon show vacuolation of hepatocytes and congestion (red arrows)(40X H&E)



Figure(11): Histopathological section of liver of pigeon show hyperplasia of hepatocytes (yellow arrow) (40X H&E)



Figure(12):Histopathological section of liver of pigeon show fatty changes(yellow arrow) congestion(red arrow) and infiltrationof inflammatory cells (white arrow) (40X H&E)

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