

Dept. of Avian and Aquatic Medicine
Faculty of Vet. Med., Suez Canal Univ.
Head Dept. Prof. Dr. Mohsen El-Dimerdash.

A STUDY ON SOME PARASITIC AFFECTIONS IN DOMESTIC PIGEONS IN ISMAILIA PROVINCE

(With One Table & 6 Figures)

By

A.I. IBRAHIM; H.H. HASSANIN; S.E.M. ALY*

and A.A. ABDEL AAL**

(Received at 10/10/1995)

دراسه على بعض الإصابات الطفيلية فى الحمام المستأنس فى محافظة الإسماعيلية
أحمد إبراهيم ، حسين حساتين ، صلاح الدين مصيلحي ، أحمد عبد العال

تم فحص عدد ٢٠٧ من الحمام المستأنس (١٠٣ من خمسة قطعان مختلفه مرباه بالنظام المغلق ، ١٠٤ حالات فرديه مرباه بالنظام المفتوح) فحصاً إكلينيكياً وتشريحياً وطفيلياً وهستوباثولوجياً. أظهرت نتائج الدراسه وجود الطفيليات الآتية بنسب متفاوتة بين القطعان المختلفه والحالات الفرديه : هادجيليا ترنكاتا ، اسكاريديا كولومبي ، كابيلاريا أوبسجئاتا ، كوتوجينيا دايجونوبورا ، أميرييا كولومبي. وتبين من الفحص التشريحي والهستوباثولوجي أن طفيل الهادجيليا ترنكاتا بالقانصه من أكثر الطفيليات إنتشاراً وتأثيراً باثولوجياً على القطعان دون الحالات الفرديه. وهذا يبين أهمية هذا الطفيل وتأثيره على قطعان الحمام خاصة المرباه بالنظام المغلق.

SUMMARY

Two hundred and seven domestic pigeons (103 from 5 different flocks and 104 sporadic cases) were subjected to clinical, postmortem, parasitological and histopathological examinations. *Hadjelia truncata*, *Ascaridia columbae*, *Capillaria obsignata*, *Cotugnia digonopora* and *Eimeria columbae* were identified among different flocks and sporadic cases. The gizzard worm (*Hadjelia truncata*) was recorded as one of the most common and pathogenic parasite among examined flocks. It was accompanied with severe gross and microscopic lesions. This declare the importance and spread of this nematode among pigeons especially in those reared under captive system. Variable infections with ascaridia, capillaria, *Cotugnia* and *Coccidia* were recorded in different flocks as well as in the sporadic cases.

Keywords: Parasitic affections-Pigeons.

*: Dept. of Pathology & Clinical Pathology

** : Dept of Parasitology

PARASITIC AFFECTIONS IN PIGEONS

INTRODUCTION

Domestic pigeons suffer from great losses due to parasitic affections. SOLIMAN (1960), SELIM and EL-KASABY (1965), AHMED and EL-SISI (1966), ISKANDER (1972), GAD (1977), ISMAIL *et al.* (1979), ABD EL-SALAM (1981), IBRAHIM (1986), Elmagd *et al.* (1988) and HUSSEIN (1991) studied the prevalence of parasitic infestation among pigeons in various Egyptian provinces. The gizzard worm (*Hadjelia truncata*) was identified and described from domestic pigeons by TADROS and ISKANDER (1975), GAD (1978) and AGGOUR *et al.* (1990). However, the pathogenicity of this species of parasite is still unclear. The aim of this study is to investigate the clinical and pathological picture associated with some parasitic affections in pigeons in Ismailia Province and to touch in deep the pathological picture of the pizzard worm.

MATERIAL and METHODS

Specimens:

A total of 207 diseased and dead adult pigeons (103 from 5 different flocks and 104 sporadic cases) were submitted to clinical and pathological examinations.

Clinical and post mortem examinations:

All examined pigeons were submitted to clinical and post mortem examinations.

Parasitological examinations: The cuticular membrane of the gizzard was detached and the muscular mucosae

were scrapped, washed with normal saline and the wash was examined for the presence of helminths using dissecting microscope. The intestinal contents were processed and examined by the sedimentation technique according to FAHMY (1949). Nematode worms were cleared, fixed and identified according to CARLETON (1957) and KRUSE and PRITCHARD (1982). Tape worms were mounted and identified according to SOULSBY (1982). Sheather's sugar flotation was used for detection of *Eimeria* and identified according to LEVINE (1985).

Histopathological examination: Tissue specimens from gizzard and intestine of affected pigeons were taken, fixed immediately in 10% buffered formalin and processed according to routine histological technique, sectioned at 5 μ , stained with H&E (LUNA, 1968). Representative slides were stained with Van Gieson's stain for connective tissue (GOMORI, 1946).

RESULTS

Clinical and postmortem examination:

Clinically, examined pigeons from flocks 1, 2 and 5 showed emaciation, inappetence, stop of reproduction and sporadic mortality, one pair weekly. In flocks 3 and 4 similar signs were observed with a relatively high mortality (3-4 daily) with greenish diarrhoea with a history of piperazine, phenothiazine

and levamisole medication. Sporadic cases showed severe emaciation.

Postmortem examination of 20 out of 28 examined pigeons from flock 1 and out of 10 pigeons in flock 2 revealed variable degree of enlargement of the gizzards (2-4 times) as shown in Fig.1. Incised gizzards showed lacerated wall, easily-peeled and thickened cuticle with dark brown discoloration and/or ecchymotic hemorrhages on the mucosa (Fig.2). Varying numbers of a nematode worms, deeply penetrated the mucosa and muscularis of the gizzards with a positive correlation between the numbers of worms and the size of the gizzards. Other systems and organs were apparently normal.

In flock 3, the gizzards of 12 out of 25 pigeons examined revealed similar lesions to the those described above but the cuticles were much thicker. The intestine showed congestion with pin-headed white necrotic foci on the serosa in the majority of the examined pigeons with severe enteritis in flock 5 and varying degree of enteritis in the sporadic cases.

Histopathological examination:

The gizzards of pigeons from flocks 1, 2 and 3 that were infected with *Hadjelia truncata* showed numerous cross sections of the parasite within the cuticle, between the epithelial cells and sometimes penetrated deeply in the submucosa. They induced thickening in the cuticular layer in some areas and complete sloughing in others (Fig. 3). Vacuolar degeneration, necrosis and cellular desquamation of the epithelial

layer were observed. Congestion, edema, hemorrhage and mononuclear leukocytes were noticed in the lamina propria, submucosa, muscularis and subserosa. The muscular layer, in a focal areas, were atrophied, necrotic and showed some collagen fiber proliferation along with thrombosed and ruptured blood vessels (Fig. 4).

The intestine of pigeons from flocks 3 and 4 showed mucinous degeneration, necrosis and focal desquamation in the epithelial lining. The intestinal lumen contained necrotic cells, mucus exudate and mononuclear leukocytes. Congestion, edema and mononuclear leukocytes were observed in the lamina propria, submucosa and muscularis. All developmental stages of coccidia were seen in the intestinal epithelium, lamina propria and submucosa of pigeons in flocks 3 and 4 (Fig. 5). Cross sections of the cestode was evident in the intestinal lumen of pigeons in flock 4, in association with numerous desquamated epithelial cells, erythrocytes and mononuclear leukocytes (Fig.6).

Parasitological examination:

Results are shown in table (1).

The gizzard worm, *Hadjelia truncata* was identified according to AGGOUR *et al.* (1990). The male had a total length of 4-8 mm with an average of 6.4 mm and the female of 17-22 with average 20 mm. The anterior end has 2 pseudolabial plates and each with two interlabial lobes. Two lateral cuticular teeth were noticed on each side and behind them, two cervical papillae were found. The oesophagus has a total length of 1.8-2.7

PARASITIC AFFECTIONS IN PIGEONS

mm with average of 2.2 mm in male and 2.0-2.4 mm with average of 2.4 mm in female and being of cylindrical type. In the female, the vulva lied at 1.5-2.5 mm with average 2 mm from the anterior end. The posterior end of the male was provided with 4 pairs of precloacal papillae as well as 2 pairs of postcloacal ones. The eggs were oval in shape measuring 50x30 μ m and having smooth, thick wall and each contained a well developed larva.

Ascaridia was identified as *Ascaridia columbae* according to KRUSE and PRITCHARD (1982). Tape worms were identified as *Cotugnia digonopora* according to SOULSBY (1982). Eimeria was identified as *Eimeria columae* according to LEVINE (1985); the oocysts are subspherical with a maximum size of 16x14 μ m and having oocystic residum.

DISCUSSION

Parasitological examination of 103 diseased pigeons from 5 different closed pigeon farms as well as 104 clinically emaciated sporadic cases indicated that parasitic infestation is widely spread among pigeons in Ismailia. Five species of parasites were identified along with their prevalence; *Hadjelia truncata* (15.9%), *Ascaridia columbae* (23.2%), *Capillaria obsignata* (4.8%), *Cotugnia digonopora* (47.8%) and *Eimeria columbae* (29.5%). The prevalence of the gizzard worm (*Gadjelia truncata*) among pigeons, in Egyptian provinces other than Ismailia, was recorded by

TADROS and ISKANDER, 1975 (2%), GAD, 1978 (10.77%) and IBRAHIM, 1986 (12.8%). FARAH (1988) reported the infestation of pigeons with this nematode in Saudia Arabia. *Ascaridia columbae* infection in pigeons was studied by ISKANDER (1972), GAD (1978), ABD EL-SALAM (1981) and IBRAHIM (1986) with a prevalence of 13.6%, 35.38%, 9.57% 33.6% respectively. In Assiut province, Gad (1978) recorded *Capillaria caudinflata* infection among pigeons with a prevalence of 6%. In Ismailia, ABDALLA and FETAIH (1995) recorded coccidiosis in pigeons due to mixed infection with *Eimeria labbeana* and *Eimeria columbae* with a prevalence of 23.4%.

In this study, the detailed clinical and pathological pictures associated with this nematode worm (*Hadjelia truncata*) in flocks 1,2 and 3 were described and the gizzard lesions were attributed to the infection with the detected nematode. The severe enlargement of the gizzard is attributed to the severe thickening of the cuticle, edema and connective tissue proliferation in the muscularis. The degenerative changes and necrosis observed in the epithelial layer could be induced by the local effect of the parasite and/or its toxic products. The severity of the lesions was correlated with the number of infested worms. The circulatory disturbances in the form of edema, hemorrhage and thrombosed blood vessels (Figs. 3 and 4) acted as a tissue response against the parasite, while

the congestion and leukocytic infiltration represented the host defence against the worms. The atrophy in the muscularis could be a result of pressure induced by the thickened cuticle and/or the direct or toxic effect of the parasite. The pathogenic alteration of the gizzard might affect the digestion process resulted in the recorded inappetence, emaciation and stop of reproduction with consequent sporadic mortalities. Similar mortalities and pathological changes associated with *Hadjelia truncata* were recorded among pigeons in Saudi Arabia by FARAH (1988). In spite of a history of piperazine, phenothiazine and levamisole medication was recorded in flock 3, heavy infestation with *Hadjelia truncata* was reported. So, the drug of choice for treatment of this nematode needs more investigation.

The severe enteritis reported in flock 3 was attributed to *Eimeria columbae* infection, the histopathological pictures, observed in all intestinal layers, resulted from the multiplication of *Eimeria* and the severe damage in the epithelium and basement membrane. This was confirmed by the presence of the

different stages of *Eimeria* in the lamina propria and submucosa along with the inflammatory reactions and circulatory disturbances in all the intestinal layers. These findings were similar to that reported, in infected pigeons with coccidiosis, by ABDALLA and FETAIH (1995).

In Flock 4, the picture of enteritis was similar to that in flock 3 in addition to the presence of cestode in the intestinal lumen which induced extensive epithelial desquamation, hemorrhages and leucocytic infiltration, which resulted from mixed infection by *Eimeria columbae* and *Cotugnia diggonopora*. While in flock 5, the severe enteritis was due to the single or mixed infection with either *Capillaria obsignata* and/or *Eimeria columbae* infection.

In conclusion, *Hadjelia truncata* is reported in this study, having severe pathologic and economic importance in pigeons. Attention should be directed to the regular parasitological examination and prophylactic treatment of domestic pigeons against different parasites identified in this study.

REFERENCES

- Abdalla, O. and Fetaih, H. (1995): Clinicopathological and histopathological studies on Coccidiosis in pigeons. Egypt J. of comparative pathology and clinical pathology, Vol. 8, No. 2, 101-107.
- Abd El-Salam, F.A. (1981): Studies on life cycle of some helmenths of poultry in Assiut Governorate. Ph.D. Thesis, Fac. of Vet. Med., Assiut Univ.
- Agour, M.G., El-Seify, M.A. and Selim, M.K. (1990): Some studies on nematodes, infesting pigeons (*Columba Livia domestica*) in Giza, Egypt. Proc. 2nd Sci. Conf. Egypt. Vet. Poult. Ass. 12-14 March (1990) 228-237.

PARASITIC AFFECTIONS IN PIGEONS

- Ahmed, A.A.S. and Elsis, M.A. (1966): Observation on diseases affecting pigeons in Egypt and their incidence with special reference to ornithosis, paratyphoid and trichomoniasis. *Egypt Vet. Med. J.* (iza) XII, 319-330.
- Carleton, H.M. (1957): *Histological technique for normal and pathological tissues and the identification for parasites*. 3rd ed. London. Oxford University Press. New York Toronto, 141-145.
- El-magd, M.M., El-badri, A.A. and Selim, M.K. (1988): Observation on pigeon blood parasites at Quena province. *Assiut Vet. Med. J.*, 20, 39, 199-202.
- Fahmy, M.A. (1949): Investigation on some of the parasites of poultry. M.V.Sc., Thesis, Fac. Vet. Med., Cairo University.
- Farah, M.O. (1988): Ventriculus worm infection in pigeon (*Columba Livia domestica*). *Br. Vet. J.* 144. (596-601).
- Gad N.A. (1978): Studies on some parasitic hemenths in domestic birds in Assiut Governorate. M.V.Sc., Thesis, Fac. of Vet. Med., Assiut Univ.
- Gomori, G. (1946): Gomori's aldehyde fuchsin method. *Techn. Bull. Regul. Med. Techn.*, 7, 115-117. Cited in Luna, L. (1968).
- Hussein M.F. (1991): Some morphologic studies on internal parasites of domestic pigeons in Giza Governorate. M.V.Sc., Thesis, Fac. of Vet. Med., Cairo Univ.
- Ibrahim, A.I. (1986): Some studies on Round worms infestation in birds. M.V.Sc., Thesis, Fac. of Vet. Med., Assiut Univ.
- Iskander, A.R. (1972): Some morphological biological studies on Ascaridia and Cotunia worms infest the Egyptian pigeons. M.V.Sc., Thesis, Fac. of Vet. Med., Cairo Univ.
- Ismail A., El-taher A.M., Salem F.S., Fayek S.A. and Shihata, A.B (1979): Prevalence of some parasitic diseases of pigeons in Sharkia. *Zagazig Vet. J.* II, June, 7-22.
- Kruse, O.W. and Pritchard, M.H. (1982): Collection and preservation of animal parasites. *Technical Bulletin 1.*, Univ. of Nebraska, Lincoln and London, P 141
- Levine, N.D. (1985): *Veterinary protozoology Chapter 7 Apicomplex. The coccidia* proper pp187-188 The Iowa State University. Ames, Iowa. USA.
- Luna, G.L. (1968): *Manual of histologic staining methods of the Armed Forces Institute of Pathology*. 3rd ed., Mc Graw-Hill Co., New York, USA, 35-37.
- Selim, M.K. and El-Kasaby (1965): The Occurrence of (*Capillaria obsignata*) madsen, 1945 in U.A.R. *J. Arab Vet. Med. Assoc.* XXV, 225-236.
- Soliman, K.N. (1960): On a pathogenic trichomonad infection of the upper digestive tract of pigeon in Egypt. U.A.R. Cairo Proc 1st Ann. Vet. Congr. Cairo, 287-292.
- Soulsby, E.J.L. (1982): *Helmenths, Arthropods, Protozoa of domesticated animals.* Reprint 7th ed. E.L.B.S. London, 178-181.
- Tadros, G. and Iskander, A.R. (1975): *Hadjelia truncata* a new parasite of pigeons in Egypt and its pathogenicity. *J. Egypt. Vet. Med. Assoc.* 35 (3): 283-301.

Table (1) demonstrate the results of parasitological examination of examined pigeons in flocks 1-5.

Flock parasite	1	2	3	4	5	Spora- dic cases	Total
<u>Hadjelia</u>	20/28 (71%)	1/10 (10%)	12/25 (48%)	0/30 (0%)	0/10 (0%)	0/104 (0%)	33/207 15.9%
<u>truncata</u>							
<u>Ascaridia</u>	15/28 (53%)	3/10 (30%)	0/25 (0%)	3/30 (10%)	0/10 (0%)	27/104 (56%)	48/207 23.2%
<u>columbae</u>							
<u>Capillaria</u>	0/28 (0%)	0/10 (0%)	0/25 (0%)	0/30 (0%)	10/10 (100%)	0/104 (0%)	10/207 4.8%
<u>obsignata</u>							
<u>Cotugnia</u>	28/28 (100%)	7/10 (70%)	0/25 (0%)	30/30 (100%)	0/10 (0%)	34/104 (33%)	99/207 47.8%
<u>digonopora</u>							
<u>Bimeria</u>	0/28 (0%)	0/10 (0%)	2/25 (8%)	30/30 (100%)	6/10 (60%)	23/104 (22%)	61/207 29.5%
<u>columbae</u>							

PARASITIC AFFECTIONS IN PIGEONS



Fig. (1): Gizzards showing variable enlargement in size, the right one is not infested and of normal size.



Fig. (2): Gizzards showing thickened cuticle with laceration and dark brown discoloration. The right one is normal.



Fig. (3) : Gizzard showing cross sections of the parasite and thickened cuticle.
H & E stain X 250

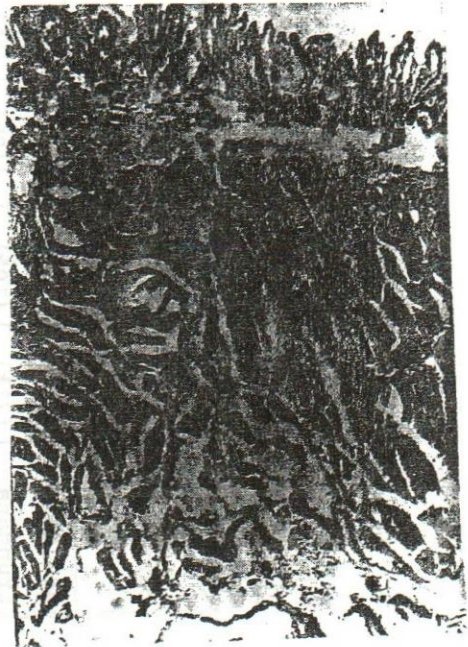


Fig. (4) Gizzard showing epithelial and muscular necrosis along with edema, hemorrhage and mononuclear leukocytes in the lamina propria, submucosa and muscularis.
H & E stain X 100.

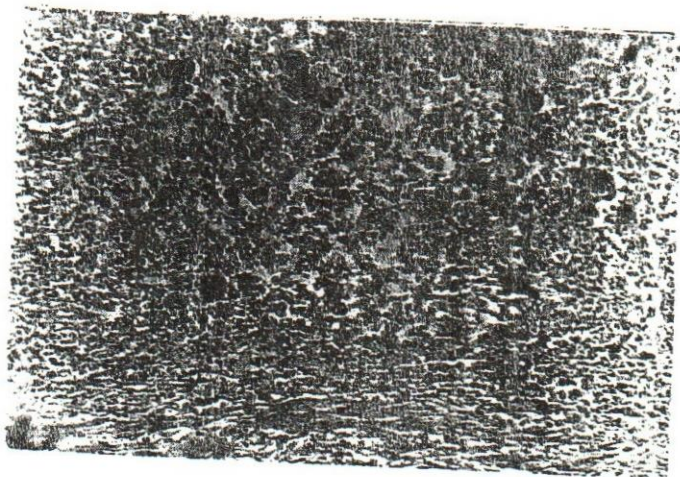


Fig. (5) : Intestine showing the developmental stages of *Eimeria columbae* and mononuclear leukocytes in the lamina propria and submucosa. H&E stain, X 250.

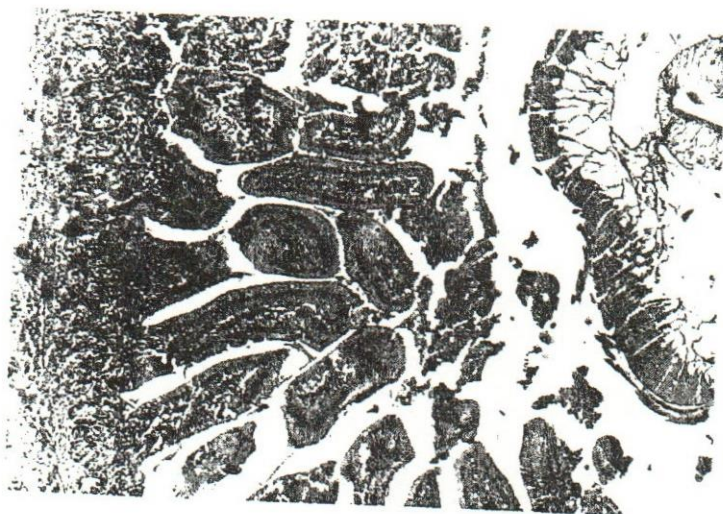


Fig. (6) : Intestine showing cross section of cestode in the lumen along with desquamated epithelial cells, erythrocytes and mononuclear leukocytes. H&E stain, X 100.

