

دراسات على الباراتفود في الداجن
بصعيد مصر

ع . بيومى ، م . ع . شحاته ، ا . سكر

اجرى هذا البحث لدراسة مرض الباراتفود في الداجن والبط بمحافظة أسسوط وسوهاج
والوادي الجديد .

اجرى الفحص على ٢٤٠ جنه من الدجاج والكتاكت النافقة ، ١٢٠ جنه من البط النافق ،
١١٤٥ عينه من براز الدجاج ، ١١٨٠ عينه من براز البط ، وعد الفحص والتصنيف
والسيرلوجى لعترات ميكروب السالمونيلا درست أهمية المرض من الناحية البكتريولوجية
والباثولوجية . ونقشت نتائج البحث .

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STUDIES ON PARATYPHOID INFECTIONS OF
CHICKENS AND DUCKS IN UPPER EGYPT
(With 2 Tables and 8 Figures)

By

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SUMMARY

A total of 240 dead chickens and 120 ducks were subjected to postmortem and bacteriological examinations for possible recovery of salmonellae. 1145 and 1180 faecal swabs were collected from diseased and apparently healthy chickens and ducks respectively and examined for the presence of salmonellae. The pathogenicity of isolated serotypes was studied. Clinical symptoms, macromorphological and micromorphological pictures were studied and discussed.

INTRODUCTION

Paratyphoid infections are considered to be the most frequently encountered bacterial diseases affecting poultry. The disease is not only responsible for high mortality in young but also for the debilitating effect which predispose for many other diseases, this beside the lowering of hatchability, fertility and egg production. Isolation, frequency and distribution of different salmonella serotypes from poultry in Egypt were reported, (EL SAWY, 1976, SHALABY, 1977, and EL TAHER, 1977). In upper Egypt, few attempts were done to study the problem in ducks (SOKKAR and REFAIE, 1967, EL AKKAD et al., 1968 and BAHGAT et al., 1971).

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The present study is the first attempt to study paratyphoid infections in chickens in Assiut, New Valley and Sohag provinces. This beside the continuation of the previous works on ducks.

MATERIALS AND METHODS

240 freshly dead chickens, 120 freshly dead ducks, 1145 chicken cloacal swabs and 1180 duck cloacal swabs were collected from different farms in Upper Egypt and were investigated for salmonellae. Direct cultures were made from liver, heart, spleen, kidney, gall bladder, intestinal contents and yolk sac if present, on selective media (SS, MacConkey, Brilliant green agars). Enriched media (Selenite F broth, Tetrathionate broth) were also used. Morphological identification of the microorganisms was done according to CRUICKSHANK et al., (1975). Those suspected isolates were subjected to a series of biochemical tests according to the criteria of EDWARDS and DWING, (1972) Seriological identification of the isolates, that produced biochemical reactions simulating salmonella, was carried out according to modified KAUFFMANN-WHITE schema described by MCWHORTER et al., 1977.

The pathogenicity of the isolated salmonella serotypes were determined in very young (1-2 day old) and older (3-4 weeks old) chickens and ducks. Birds were infected orally with 100×10^6 viable organisms. The experimentally infected birds were kept under observation for 30 days, clinical manifestations, post-mortem pictures, histopathological findings and bacteriological results were recorded. For microanatomical examinations, specimens from livers, kidneys, lungs, brains,

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hearts, spleens and intestines were taken and fixed in 10% neutral formalin. Paraffin sections were obtained, stained with H&E and examined.

RESULTS

I- Bacteriological results:-

The isolated, biochemically and serologically identified serotypes are tabulated in table (1) and (2). In this present work S. hessarek, S. miami, S. typhimurium var copenhagen, S. banalia, S. canada, S. arechavaleta, S. paratyphi A, S. paratyphi B, S. sendai, S. fulica, S. gatuni, S. galiema and S. presov are recorded for the first time from chickens in Egypt. The recovery of S. arechavaleta, S. paratyphi A, S. galiema, S. san-juan and S. miami are also isolated for the first time from ducks in Egypt.

II- Clinical symptoms:-

The clinical symptoms observed included, loss of appetite, sleepy appearance, depression, grasping of air, retardation of growth and whitish diarrhoea (Fig. 1,2,3). Some nervous manifestations were occasionally observed especially in ducklings (Fig. 4). It was also found that the very young birds 1-2 days old were more susceptible and showed higher mortality rate than the older ones.

III- Pathological results:-

Essentially all chickens and ducks experimentally infected with Salmonella microorganisms, either isolated from living or dead birds were examined and exhibited pathological alterations, however these alterations were to a less extent in older birds than in very young ones.

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Morbid anatomical findings:-

The morbid anatomical picture included emaciation, subcutaneous haemorrhages and enlargement of the liver and spleen. The gall bladder was enlarged. Mottling of the liver and streaks of haemorrhages on its surface were also observed. In some cases focal, irregular, distinct, pale grayish areas of necrosis on the liver surface could be detected. In three cases fibrinopurulent perihepatitis was found.

Most of the examined cases showed enteritis of catarrhal type, although some of them showed necrotic type of enteritis. In most of cases the caeca were distended with coagulated cheesy like material (caecal plugs). The kidneys were slightly enlarged and some cases showed mottling appearance. Nearly in all the cases the ureters were plugged with urates. The air sacs were somewhat opaque and most of cases showed yellowish fibrinous plaques. In few cases the trachea showed mild congestion. The lungs of all cases were severely congested and in some cases frothy exudate could be observed. Nearly all the examined hearts revealed subepicardial and subendocardial haemorrhages with severe congestion of the coronary vessels. Moderate serous pericarditis was observed in one third of the examined birds. In five cases fibrinopurulent pericarditis identical to that observed in the air sacs and liver capsule was observed. The fibrinous reaction was of the cropous type.

Unabsorbed yolk sacs could be seen in chicks and duckling till the 7th day post infection.

Moreover congestion of the brain and haemorrhages on the meninges were constant findings especially in ducklings.

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Histomorphological findings:-

LIVER:

The parenchyma of the liver showed proteinous dystrophy together with fat dystrophy (Fig. 5). The proteinous dystrophy varied from cloudy swelling to hydropic degeneration. The dystrophic changes had no definite distribution but in the majority of cases were universally distributed in the lobules. Moderate to severe liver congestion accompanied with slight activation of the reticuloendothelial cells were noticed. Perivascular round cell infiltrations were likewise detected in the portal spaces which were enlarged and oedematous. In few cases sharply demarcated, areas of coagulative necrosis could be detected (Fig. 6). Hyaline, fibrinous and fibrinocellular thrombi in the portal vessels were commonly found near the areas of coagulations. In few cases Salmonella granuloma could be seen (Fig. 7). Fibrinous perihepatitis could be also occasionally detected (Fig. 8).

LUNGS:

The lungs of the examined cases showed severe congestion of the interlobular blood vessels, pneumonia, serous effusions in the interlobular spaces and haemorrhages.

HEART:

The pericardium showed severe congestion. In the cases diagnosed as fibrinous pericarditis, the pericardium was greatly thickened with fibrin network which entrapped leucocytes and macrophages in its meshes.

In the myocardium dystrophic changes ranging from granular proteinous dystrophy to coagulative necrosis, fragmentation and

lysis of some myocardial cells and intermyocardial muscle cell haemorrhages could be observed.

INTESTINE:

The micromorphological alterations in the intestines varied from slight catarrhal to necrotic enteritis. Different degenerative changes in the epithelial cell lining of the villi had been seen. Detachment of the epithelial cell lining of the villi together with desquamation of the villi themselves in some cases could be detected. The mucous glands showed various degenerative changes.

KIDNEYS:

The microanatomical examination of the kidneys revealed tubulonephrosis. Some of the glomeruli were swollen and others showed thickening and cellular infiltrations.

BRAINS AND SPLEENS:

Nothing could be detected other than congestion.

DISCUSSION

The present work was carried out to study and investigate some aspects of paratyphoid infection in chickens and ducks in Assiut, New Valley and Sohag provinces.

In many countries all over the world Salmonella serotypes were isolated from chickens and ducks, (EDWARD and BRUNER, 1943, EDWARDS et al. 1948, NORBERG and EKSTAM, 1950, DOUGHERTY, 1953, EL AKKAD et al., 1968, BAHGAT et al. 1971; WILLIAMS, 1972, AL KHATIB et al., 1975, and SEUNA et al., 1978). Regarding Egypt; S. hessarek, S. miami, S. typhi-murium var copenhagen, S. banalia,

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S. canada, S. arechavaleta, S. paratyphi A, S. paratyphi B, S. sendai, S. fulica, S. galiema and S. presov were isolated for the first time from chickens. From ducks in upper Egypt S. arechavaleta, S. paratyphi A, S. galiema, S. san-juan and S. miami were isolated also for the first time. No isolation of *Salmonella gallinarum pullorum* was recorded in this study and this may be attributed to the control measures applied among birds.

Clinical signs observed in our study were reported in experimental and natural avian salmonellosis by FLANERY, (1954); WILLIAMS, (1972) and AL FALLUJI et al. (1972). Concerning the macro- and micro-morphological changes, it was found that there were clear pathological changes in different organs. In our results the liver was enlarged and features of hyperaemia were frequently present. Microscopically the most prominent findings were those dystrophic changes which were accompanied with round cell infiltrations in the oedematous portal areas. These findings indicate parenchymatous hepatitis but with well manifested alterative changes. Coagulative necrosis described in our work was also observed by DYAKOV (1966) and AL FALLUJI et al., (1972). In the available literature, no one has explained the pathogenesis of liver necrosis in avian salmonellosis. We suggest that the liver necrosis in our work could be assumed at least partly, to the fibrinous and fibrinocellular thrombi seen in the portal vessels. The latter may be due to the action of the *Salmonella* organisms and or its toxins on the vessel wall, together with the disturbance in blood flow as the result of changes in cardiac muscles. Moreover, Highly toxic strains of *Salmonella* may produce focal necrosis rather than **granuloma** in calves (CHORS, 1966).

Lung pneumonia, congestion, haemorrhages and serous effusions described in present work were also described and discussed by KARLSHOJ and MARTHEDAL, (1949) and BAHGAT et al. (1971).

In our findings the hearts showed myocardial degenerative changes and infarct like areas. This was also described by DYAKOV, (1966) and BAHGAT et al. (1971). Myocardiosis could be considered one of the causes of vascular changes in the parenchymatous organs. The myocardial, subepicardial and subendocardial extravasations seen in our experiment could be assumed to the effect of the bacteria and or its toxins on the vascular permeability. The fibrinopurulent perihepatitis and pericarditis were described by WILLIAMS (1972).

Intestinal inflammatory changes including catarrhal and haemorrhagic types of inflammation were also described by AL FALLUJI et al. (1972). In our experiment we infected the birds via the digestive tract, and this may explain the presence of necrotic enteritis and cheesy like material in the caeci of the examined birds.

In our present study the spleen was congested. But fibrinoid changes described by SOKKAR and BASSIOUNI, 1974 in the spleen of ducks were not found. This can be due to the difference in age and breed used.

Although central nervous lesions observed by DOUGHERTY, (1961) could not be detected in present work, however congestion of the brain and haemorrhages on the meninges may explain the nervous manifestations observed.

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Table (1)

Salmonella serotypes isolated from dead and living chickens.

Serial No.	Salmonella serotype	Sero-group	No. of strain isolated	Percentage
1	S. hessarek	B	14	22.58
2	S. orion	E ₁	9	14.52
3	S. miami	D ₁	9	14.52
4	S. thompson	C ₁	6	9.68
5	S. typhi-murium	B	4	6.45
6	S. typhi-murum var copenhagen	B	4	6.45
7	S. banalia	C ₂	3	4.84
8	S. canada	B	2	3.22
9	S. arechavaleta	B	2	3.22
10	S. paratyphi A	A	2	3.22
11	S. paratyphi B	B	1	1.61
12	S. enteritidis	D ₁	1	1.61
13	S. sendai	D ₁	1	1.61
14	S. fulica	B	1	1.61
15	S. gatuni	C ₂	1	1.61
16	S. galiema	C ₁	1	1.61
17	S. presov	C ₂	1	1.61

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Table (2)

Salmonella serotypes isolated from dead and living ducklings.

Serial No.	Salmonella serotypes.	Sero-group	No. of strains isolated.	percentage.
1	S. thompson	C ₁	19	38
2	S. arechavaleta	B	7	14
3	S. paratyphi A	A	6	12
4	S. glaiema	C ₁	5	10
5	S. paratyphi B	B	3	6
6	S. typhimurium	B	3	6
7	S. anatum	E ₁	2	4
8	S. san-juan	C ₁	1	2
9	S. miami	D ₁	1	2
10	S. cholera-suis	C ₁	1	2
11	S. untyped	--	2	4

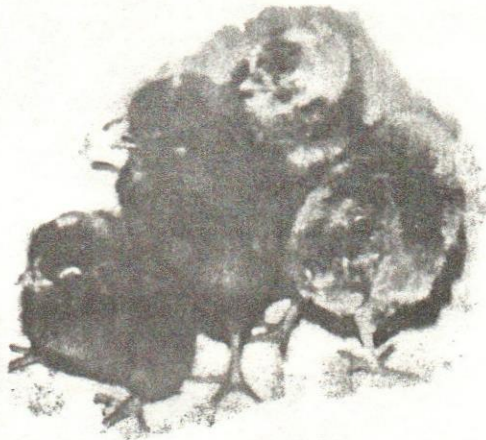


Fig. (1): Chicks showing sleepy appearance and depression



Fig. (2): 24 days old chick showing depression and ruffled feathers.



Fig. (3): Duckling laying on back,
kicking with pasty vent.



Fig. (4): 21 days old duck showing
nervous manifestations.

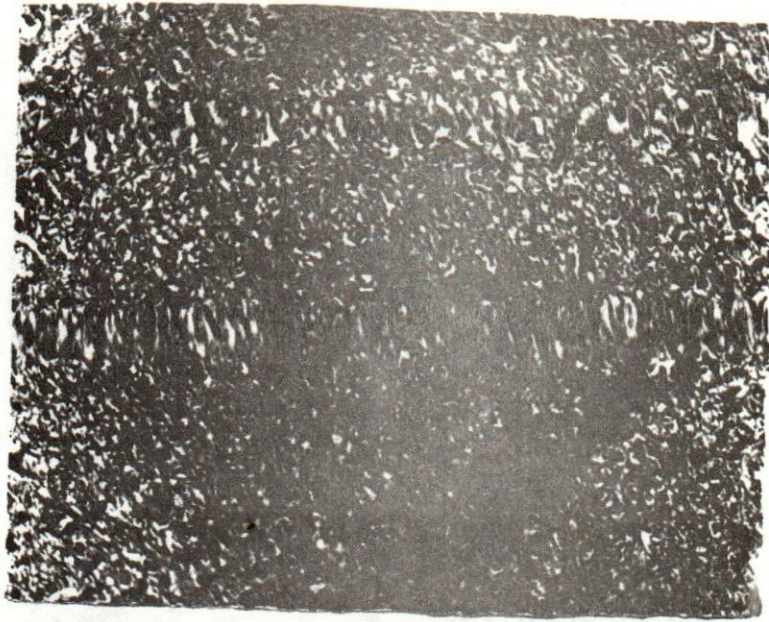


Fig. (5): Liver showing proteinous dystrophy together with fat dystrophy
H. & E. 25x10.



Fig. (6): Liver showing area of coagulative necrosis. H. & E. 25x10.



Fig. (7): Liver showing focal cellular proliferation (S.granuloma).

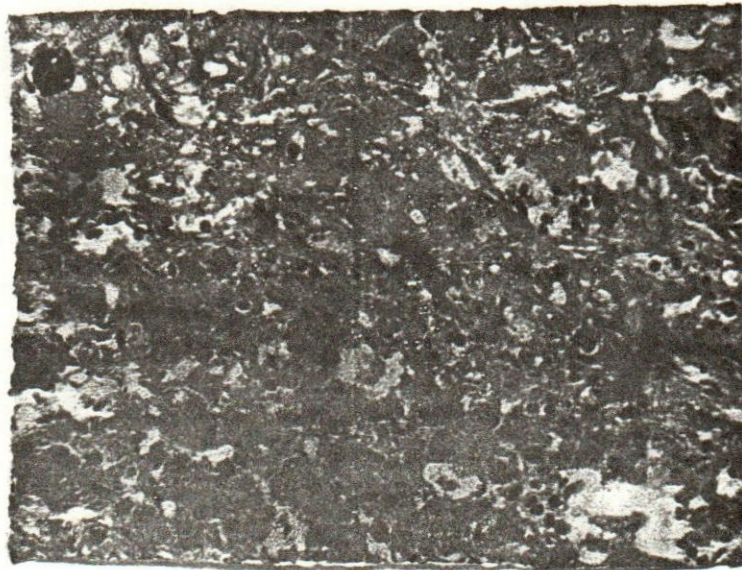


Fig. (8): Liver showing fibrinopurulent perihepatitis. H. & E. 25x10.