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Short Communication

Seroepidemiology and pathology of mycoplasmosis and salmonellosis in chickens of some model breeder poultry farms

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Abstract

The research work was conducted to determine the seroepidemiology and pathology of mycoplasmosis and salmonellosis in chickens of some selected poultry farms situated at Chatkhil, Noakhali of Bangladesh. A total of 273 serum samples were collected and tested by serum plate agglutination test both for detection of *Mycoplasma* and *Salmonella* infections. For the pathological study 5 *Mycoplasma* seropositive and other 5 *Salmonella* seropositive live chickens were collected randomly from the farms and sacrificed for necropsy and pathology. Seroprevalence of *Mycoplasma* and *Salmonella* infections were 55.6 and 27.1%, respectively. Seasonal prevalence of mycoplasmosis in summer and winter were 51.9% and 59.4% and salmonellosis in summer and winter were 30.4% and 23.8%, respectively. In post mortem investigation the lesions in *Mycoplasma* positive birds included slight congestion, dark unifocal to multifocal hemorrhagic spot with slightly fibrinous exudate on the lung, flaccid heart, pale and enlarged liver and severely dark, swollen spleen and slight hemorrhagic spot in the ovary with stalk formation. In histopathology the results were found to be mild focal to diffuse interstitial pneumonia with pluitis and proliferation of pneumocytes-II, infiltration of lymphocytes and macrophages and severe congestion and hemorrhage in lungs. In liver very few to small-scattered necrotic foci infiltrated with different type of inflammatory cells were found. The *Salmonella* seropositive birds showed pale liver, slightly hemorrhagic darker ovary with stalk formation. Microscopically, very few scattered necrotic foci infiltrated with different types of inflammatory cells in liver and mild chronic enteritis was observed. However, further studies should be conducted for isolation and identification of different *Mycoplasma* and *Salmonellae*, determination of their immunogenic variation and establishment of vaccine with isolated *Mycoplasma* and *Salmonellae*.

Keywords: Mycoplasmosis, Salmonellosis, Seroprevalence and Pathology

Introduction

Village poultry production plays an important role in the economy of Bangladesh. Outbreak of several devastating diseases is one of a major constraint of poultry rearing in Bangladesh. Salmonellosis and mycoplasmosis cause heavy economic loss through mortality and reduced production (Jordan, 1979). For the expansion of poultry farming, it requires to prevent and control the diseases. Effective preventive and control measures cannot be undertaken unless statuses of the diseases are known. Therefore, the present study was undertaken to determine the seroepidemiology of mycoplasmosis and salmonellosis in Fayoumi chickens of model breeder poultry farm at (Small Livestock Holders Development Programme-2, SLDP-2 Area) Chatkhil upozila of Noakhali district and the pathology in seropositive apparently healthy birds.

Materials and Methods

The research work was divided into two sections; seroepidemiology of salmonella and mycoplasma infections and the pathology in the seropositive apparently healthy birds.

There were two types of breeder poultry farm in SLDP-2 at Chatkhil, Noakhali; Model Breeder Poultry Farm (MBPF), consist of at least 60 chickens and Mini Model Breeder Farm (MMBPF), consist of at least 8 chickens. In this study 2 MBPF and 7 MMBPF were considered for examination. None of the tested flocks were vaccinated against salmonellosis and mycoplasmosis. So there was no chance for false positive reaction.

The study was conducted during winter (November to January) and summer (April to June) season of the year 2003-2004. Blood samples were collected two times from each of the farms during summer and winter.

A total of 273 blood samples were collected aseptically from the wing vein by sterile plastic syringe. These were then allowed to clot at room temperature. These were transferred to the laboratory for further examination. Clots were separated and sera were collected in 1.5 ml endorf tube and then centrifuged (if required) to have clear sera.

Standard *Salmonella* (Nobilis® SP) antigen and *Mycoplasma gallisepticum* (Nobilis®) antigen manufactured by Intervet International, Holland were used for Serum Plate Agglutination Test (SPA test). Antigen of 0.02 ml and chicken sera of 0.02 ml were placed side by side with a micropipette on a ceramic tile and mixed thoroughly by stirring with tooth pick followed by rocking. Results were read within 2 minutes. The instructions were followed from Kleven and Yoder (1989).

The sera tested above were heated in water bath at 56°C for 30 minutes to rule out the possibility of nonspecific reaction. Then these were again tested by their respective antigens as described above (OIE Manual, 2000).

A total of 5 *Salmonella* seropositive and 5 *Mycoplasma* seropositive birds were collected from MBPF and MMBPF and transported to the Department of Pathology BAU, Mymensingh.

The collected seropositive birds were sacrificed and the organs containing lesions were studied, collected and preserved at 10% neutral buffered formalin for histopathological study. After fixing, the tissues were processed, sectioned and stained as standard procedure (Luna, 1968). Photomicrography was taken using photomicrographic camera (Olympus PM-C 35 Model).

Data were analysed by SPSS Package program. The significance of differences between means was tested at the level of $p > 0.05$.

Results and Discussion

Seroprevalence study

Seroprevalence of mycoplasmosis: Seroprevalence of mycoplasmosis in MBPF and MMBPF has been showed in Table 1. The highest seroprevalence recorded was 66.7% in one MBPF and the lowest was 40% in another MMBPF, where the overall prevalence was 55.6%. The results are in agreement with previous investigations (Chrysostome et al., 1995, Pradan et al., 2000, Alam et al. 2003, Dulali, 2003 and Sarker, 2004). They reported prevalence of Mycoplasmosis was 62%, 57.2%, 100%, 52% and 58.9%, respectively. The present study was higher then Biswas et al. (1992) and Amin et al. (1992). They reported 13-32% seroprevalence of Mycoplasma infection in their research work.

Table 1. Seroprevalence of *Mycoplasma gallisepticum* infection on the basis of rearing pattern

Study area	No. of flock tested	No. of serum tested	Positive cases	Prevalence	Overall prevalence
MBPF	2	175	105	59.70	55.60
MMBPF	7	98	51	51.49	

Seroprevalence was also observed on the basis of seasons. The results are shown in Table 2. In this study it was observed that the highest prevalence was in winter 59.4% while lowest 51.9% in summer that are in agreement with a previous study (Pradan *et al.*, 2000). This may due to favourable, temperature in the winter. The cold temperature may influence the spread of infection (Chandiramani *et al.*, 1966 and Christensen *et al.*, 1994). Mycoplasmosis was higher in MBPF than MMBPF (Table 1). It may be due to the managemental variation (Dulali, 2003).

Table 2. Sesonal seroprevalence of *Mycoplasma gallisepticum* infection in MBPF and MMBPF at Chatkhil, Noakhali

Study area	No. of flock tested	Seasons					
		Winter			Summer		
		Total serum tested	Positive cases	Prevalence	Total serum tested	Positive cases	Prevalence
MBPF	2	95	60 (63.16%)	59.36%	80	45 (56.25%)	51.93%
MMBPF	7	56	31 (55.26%)		42	20 (47.62%)	

Seroprevalence of salmonellosis: The seroprevalence of salmonellosis in the selected MBPF and MMBPF has been showed in Table 3. The prevalence of Salmonellosis was found 16-42% with a overall of 27.1%. The result of the present study is similar with a previous report (Sarker, 2004) but higher then few previous report in different regions of Bangladesh and other countries of the world (Schluter *et al.*, 1994, Koncicki *et al.*, 2000, Tran, 2000, Gita *et al.*, 2001 and Tamba *et al.*, 2001). They reported the prevalence was ranging from 6.2-15.2%.

Table 3. Seroprevalence of *Salmonella* infection on the basis of rearing pattern

Study area	No. of serum tested	Positive cases	Prevalence	Overall prevalence
MBPF	175	43	21.97	27.06
MMBPF	98	51.71	32.15	

In winter the prevalence of salmonellosis was 23.8% while in summer it was increased to 30.4%. The detail results are shown in Table 4. The increased prevalence of salmonellosis (Table 3) in MBPF (22.0%) and MMBPF (32.2%) was probably due to lack of proper management pattern of rearing system. (Dulali, 2003).

Table 4. Seroprevalence of *Salmonella* infection on the basis of seasonal variation in MBPF and MMBPF at Chatkhil, Noakhali

Study area	No. of flock tested	Seasons					
		Winter			Summer		
		Total serum tested	Positive cases	Prevalence	Total serum tested	Positive cases	Prevalence
MBPF	2	95	18(18.95%)	23.76%	80	20(25%)	30.39%
MMBPF	7	56	16 (28.75%)		42	15(35.71%)	

Pathological study

Pathology in *Mycoplasma* seropositive birds: The necropsy findings in *Mycoplasma* seropositive birds have been presented in Table 7. The lesions included slight congestion, dark unifocal to multifocal hemorrhagic spot with slightly fibrinous exudate on the lung surface. The heart was also found flaccid in many birds. Livers of the two sampled birds were pale and enlarged and one of the spleens was severely dark and swollen. Slight hemorrhagic spot was found in the ovary of two birds with stalk formation. In pathological investigation the results were found to be mild focal to diffuse interstitial pneumonia (Plate 1) with pluitis and proliferation of pneumocytes-II, infiltration of lymphocytes and macrophages and severe congestion and hemorrhage in lungs. In liver very few to small-scattered necrotic foci infiltrated with different type of inflammatory cells were found. These lesions are probably due to the latent *Mycoplasma* infection in these birds (Dykstra et al., 1985, Tian and Guo, 1989, Glavits et al., 1993, Nunoya et al., 1995, Talha, 2001, and Dulali, 2003). Results could indicate that latent *Mycoplasma* infection in apparently healthy birds harboured the pathological change in the visceral organs, which might have hampered the egg productions in the layer chickens.

Pathology in *Salmonella* seropositive birds: The *Salmonella* seropositive birds showed pale liver, slightly hemorrhagic darker ovary with stalk formation. Microscopically, very few scattered necrotic foci infiltrated with different types of inflammatory cells in liver (Plate 2) and mild chronic enteritis was observed. These types of lesions are supported for *Salmonella* infection by different investigators (Chishti et al., 1985, Gorham et al., 1994, Binta et al., 1996, Talha, 2001, Habib-ur-Rahman, 2003 and Refgum et al., 2003).

However, for further studies may be conducted to isolate and identify different strains of *Mycoplasma* and *Salmonellae*, to determine their immunogenic variation and to suitable vaccine with isolated *Mycoplasma* and *Salmonellae*.

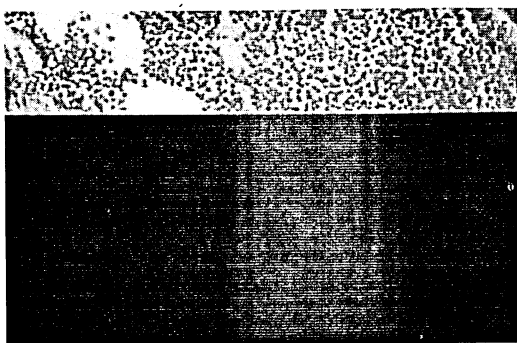


Plate 1. Section of lung shows diffuse interstitial pneumonia in *Mycoplasma* sero-positive apparently healthy bird (H&E, $\times 330$).

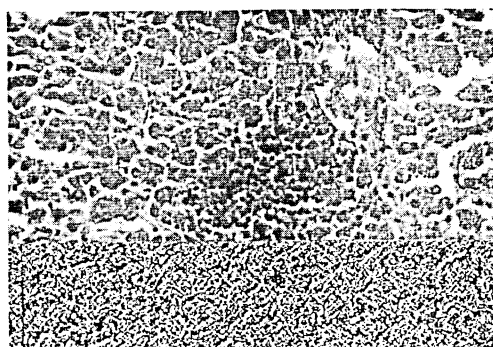


Plate 2. Section of liver shows focal necrosis with infiltration of different types of inflammatory cells (H&E, $\times 82.5$).

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