



RESEARCH ARTICLE

Seroprevalence and pathological investigation of salmonellosis in poultry

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Özet

Mamun MA, Bhuiyan MJU, Zinnah MA, Khair A, Hassan MM, Uddin MB. Kanatlılarda salmonellosis seroprevalansı ve patolojik incelenmesi. *Eurasian J Vet Sci*, 2011, 27, 4, 227-229

Amaç: Araştırmada kanatlılarda Salmonella seroprevalansı ve patolojisinin belirlenmesi amaçlandı.

Gereç ve Yöntem: Rastgele 200 adet kanatlı serumu plate agglutination test için toplandı ve şüpheli kanatlılardan 28 adet örnek patolojik ve histopatolojik incelemeler için seçildi. Seroprevalansı belirlemek için serum plate agglutination testi ve rutin histopatolojik test kullanıldı.

Bulgular: İncelenen 200 adet örneğin 76 Salmonella yönünden pozitif tespit edildi ve seroprevalans %38.0 olarak belirlendi. Özellikle karaciğer (hemaraji, nekrotik alanlar, heterofil infiltrasyonu) ve barsaklarda (goblet hücre proliferasyonu) farklı makroskopik ve mikroskopik lezyonlar gözlemlendi.

Öneri: Bangladeş çiftliklerinde Salmonella enfeksiyonunun varlığını belirlemek için yeni çalışmalara ihtiyaç duyulmaktadır.

Abstract

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Aim: Aim of this study was to determine the seroprevalence of Salmonella along with pathological investigation in poultry.

Materials and Methods: A total of 200 birds were selected randomly for collection of serum for serum plate agglutination test and 28 samples were collected from suspected birds for gross and histopathological study. Serum plate agglutination test was performed for detection of seroprevalence and routine histopathological method was used.

Results: Out of 200 samples, 76 birds were Salmonella-positive giving the overall seroprevalence of 38.0%. Various macroscopically and microscopically pathologic lesions observed especially in the liver (haemorrhage, necrotic foci, heterophil infiltration) and intestine (goblet cell proliferation).

Conclusion: Further studies are need for the determination of the presence of Salmonella infection in farms of Bangladesh.

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Keywords: Salmonellosis, poultry, seroprevalence, pathology

► Introduction

Among different constraints of poultry industries, outbreaks of salmonellosis is one of the major constraints causing economic loss and discouraging poultry rearing (Das et al 2005). Avian salmonellosis is considered as a major bacterial disease in the poultry industry worldwide. The importance of salmonellosis in poultry sector has increased to be growing concern day by day throughout the world during the last decades. The etiologic agents are responsible for various pathogenic processes in man and animals including poultry (Freeman 1985). Infections with bacteria of the genus *Salmonella* are responsible for major problem of poultry farming in Bangladesh (Kamaruddin et al 2003). Salmonellosis in poultry causes significant economic loss due to mortality and reduced production (Khan et al 1998). With the expansion of poultry rearing and farming, prevalence of salmonellosis in both breeder flock, commercial broiler and layer flocks is increasing day by day. Pathological investigation is an important thing for the diagnosis of disease which helps in the proper treatment of salmonellosis and control of the disease in poultry farm. Keeping this in consideration this seroprevalence study and pathological investigation was undertaken.

► Materials and Methods

The present research work was conducted during the period from January to December, 2010 in the laboratory of the Department of Pathology & Parasitology, and Anatomy and Histology, Sylhet Agricultural University, Sylhet, Bangladesh. Research was approved by a legal ethic committee. A total of 200 chickens belonging to 4 groups Starter (0-8 wks), Pre layer (9-20 wks), Layer (21-60 wks) and Post layer (>60 wks) of the 25 poultry farms of Sylhet region of Bangladesh was examined for seroprevalence study. Blood was aseptically collected from the wing veins and sera were separated. Standard Salmonella antigen (Salmonella O, S & A reagent company, Bangkok, Thailand) was used for rapid serum plate agglutination (SPA) test for the detection of Salmonella antibodies to determine the seroprevalence. Suspected visceral organs of 28 dead birds were also collected for gross and histopathological study.

Chi-square test was used in the evolution of between groups. $p < 0.05$ was accepted as statistically significance level.

► Results

Out of 200 samples, 76 chickens were *Salmonella*-positive giving the overall seroprevalence of 38.0% in live birds and the rate of seroprevalence increased with advancement of age of birds (Table 1). The chickens were categorized by four types of groups rearing practices in our farming system. The percent (%) proportion of *Salmonella*-positive and negative cases were 38% and 62%, respectively. While that observed

in different categories were 14.5% starter, 27% pre-layer, 46% layer and 12.5% post layer (Table 2). Significant differences ($\chi^2=25.6$, $p < 0.001$) showed in different categories (Table 1). In pathological investigation, grossly the lesions in the liver showed variable changes including enlargement and congestion, haemorrhage, friable and bronze discoloration with necrotic foci. Spleen was enlarged, discolored and in some cases it shows shiny. Ovary of *Salmonella* affected chicken showed haemorrhage and congestion with deformed ova. Lungs were congested, haemorrhagic and pneumonic. Lesions found in the intestine were various types of enteritis moderate to severe mucous in the intestine. Yolk sac was haemorrhagic and congested. Microscopically the liver showed focal degeneration, necrosis with haemorrhage and congestion. Section of liver shows infiltration of heterophils mainly histiocytes and accumulation of leukocytes which replaced the degenerated or necrotic liver cells (Figure 1). Section of infected spleen showed haemorrhage and congestion with infiltration of inflammatory cells. In intestine, there were excessive proliferation of goblet cells with infiltration of inflammatory cells in the mucosa and submucosa (Figure 2).

Table 1. Seroprevalence of *Salmonella* infections in different groups of chickens.

Category	Examined	SPA (-)	SPA (+)	Prevalence
Starter (0-8 wks)	29	25	4	13.79%
Pre layer (9-20 wks)	54	41	13	24.07%
Layer (21-60 wks)	92	51	41	44.56%
Post layer (>60 wks)	25	7	18	72.00%
Total	200	124	76	38.00%

SPA; serum plate agglutination test, $\chi^2=25.6$, $p < 0.001$ significant in categories.

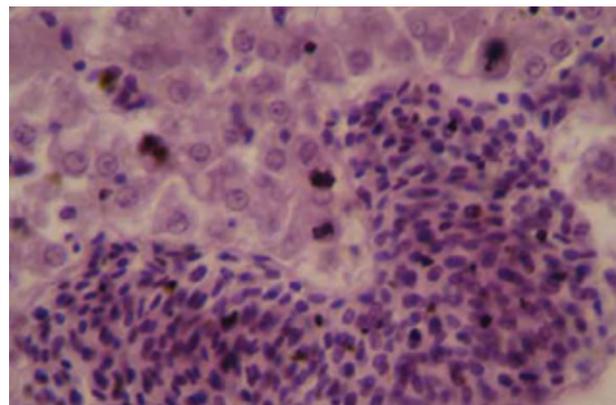


Figure 1. Section of liver shows infiltration of heterophils mainly histiocytes.

► Discussion

The overall seroprevalence of *Salmonella* infection was detected as 38.0% (Table 1). In the studies, lower and higher seroprevalences were reported (Ashenafi et al 2003, Habibur-ur-Rehman et al 2003, Akter et al 2007, Hossain et al 2010). This difference may be

due to geographical variation or density of population. It was found that the prevalence increased with the increase of age. Significant differences ($\chi^2=25.6$, $p<0.001$) observed in different categories (Table 1 and 2). Similar results were also reported previously (Akter et al 2007, Ahmed et al 2008, Hossain et al 2010). In pathological investigation, pathologic lesions were observed in the liver, spleen, ovary, lungs, intestine and yolk sac (Figure 1-2). Discolored eggs were also found. These findings were supported by many researchers (Hossain et al 2006, Desmukh et al 2007, Ahmed et al 2008). In the microscopic examination, some lesions were determined in the liver (degeneration, necrosis, haemorrhage, heterophil infiltration, etc), spleen (haemorrhage, inflammatory cell infiltration), intestine (goblet cell proliferation), cecum (goblet cell proliferation) and egg follicles (Figure 1-2). Similar findings were also reported by researchers (Hossain et al 2006, Desmukh et al 2007, Ahmed et al 2008).

Table 2. Percentages (%) of estimation in different categories with 95% Confidence Interval

Category	Percentages (%)	Standard Error	95% Confidence Interval	
			Lower limit	Upper limit
Starter	14.50	2.495	9.57804	19.421
Pre layer	27.00	3.147	20.79397	33.206
Layer	46.00	3.533	39.03299	52.967
Post layer	12.50	2.344	7.87694	17.123
Case				
Negative	62.00	3.440	55.21487	68.785
Positive	38.00	3.440	31.21487	44.785

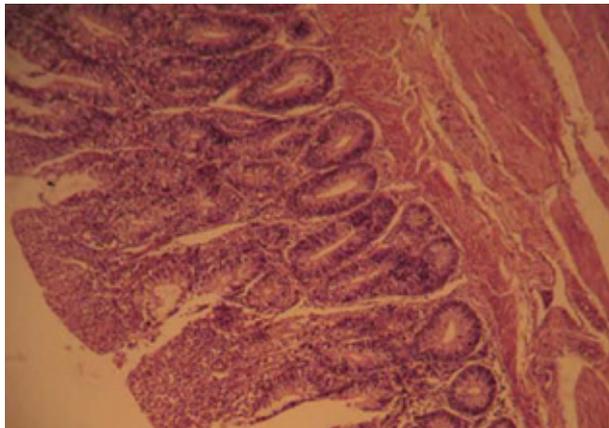


Figure 2. Section of intestine showing enteritis with excessive proliferation of goblet cells, infiltration of plasma cells, heterophils and macrophages.

► Conclusions

The results of the present investigation suggests that further study of the presence of *Salmonella* in multiple large-scale farming operations; however, the study provides useful information for all farmers and researchers concerned about the disease control.

► Acknowledgements

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