

Dynamics of Associative Infection of Domestic Chickens with Eimeriosis and Infectious Diseases in Azerbaijan

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Abstract

The article refers to the associative infection of birds with invasive and infectious diseases in the poultry farm of the Siyazan region. In order to determine the infection with *Eimeria*'s oocytes and opportunistic microbes of domestic chickens, pathological materials from 35- and 55-day-old chicks of domestic chickens of a silver breed were used. As a result of the study, the following causative agents were identified in the carcasses of 35-day-old birds: *Escherichia coli* in 11 birds (17.0%), *Salmonella enteritidis* in 28 birds (43.0%), *Staphylococcus pyogenes aureus* in 4 birds (6.1 %).), *Streptococcus faecalis* in 3 birds (4.6%), and out of invasive diseases the following causative agents of eimeriosis were identified: *Eimeria acervulina* in 5 birds (7.7%), *Eimeria tenella* in 8 birds (12.3%), *E. mitis* in 6 birds. (9.2%), *E. maxima* in 5 birds (7.7%).

When examining the carcasses of 55-day-old birds the causative agents of infectious diseases: *Escherichia coli* in 10 birds (16.6%), *Salmonella enteritidis* in 20 birds (33.3%), *Staphylococcus pyogenes aureus* in 3 birds (5.0%), *Streptococcus faecalis* in 6 birds (10.0%), and out of invasive diseases the following causative agents of eimeriosis: *Eimeria acervulina* in 4 birds (6.6%), *E. tenella* in 7 birds (11.6%), *E. mitis* in 5 birds (8.3%) and *E. maxima* in 3 birds (5.0%) were studied.

Keywords: domestic chickens, invasion, infection, mixed infection, examination

Introduction

Poultry farming is one of the important sectors in providing the population with food products. It is known that for a long time poultry farming existed in households, and only since recently, it has formed and developed as an independent branch of agriculture.

Special attention and care is paid to the development of this area in our country. Therefore, today poultry farms have got a special/vital/critical role in providing the population of the region with poultry meat and eggs through domestic production. Along with the measures taken to increase the production of poultry meat and eggs in households and small businesses, modern poultry farms are being created and old ones are being reconstructed, owing to preferential loans provided by the state.

In connection with the intensification of poultry farming as a fast-growing and economically profitable sector in the second half of the last century, poultry factories, focusing on the production of meat and eggs, were created in Azerbaijan. Having gained the Republic independence, these farms were privatized and developed in compliance with economic reforms.

As a result of the transition of poultry farming to a farm basis, the epizootic situation for infectious and invasive diseases, especially for the ones caused by opportunistic microbes and eimeria, has changed significantly (Mikailov & Mamedova, 2014). Thus on the one hand, in the poultry farms, , due to the accumulation of birds of different ages in large numbers in a limited area and their regular renewal, deficiencies in the conditions of feeding and keeping, the even greater sensitivity of fertile crosses to stress factors and diseases, on the other hand, due to the cessation of the development of the beneficial microflora of the gastrointestinal tract in connection with the administration of drugs to chickens, the general condition and natural protective functions of the bird's body weaken from the first day. (Musayev et al., 1991). In this case, the immune balance between the microorganism and the macroorganism is disturbed, leading to creating favorable conditions for the development of pathogens of infectious and invasive diseases, and as the result the occurrence and spread of the disease. In such condition, the disease is diagnosed using diagnostic methods (Nakhmanson & Burba, 1990).

The mixed course of diseases such as salmonellosis, colibacillosis, staphylococcosis, streptococcosis and out of invasive diseases, the eimeriosis caused by opportunistic microbes causing economic damage to poultry farms, an epizootic situation, identification of factors, creating conditions for their occurrence, as well as their spread, control measures against them are being studied (Borisenkova et al., 2011; Mikayilov, 2014; Mirzakov & Tashbulatov, 2011; Lesnichenko & Emaluev, 2011). Hence, through our research, we set a goal for ourselves, to study the occurrence in an associative form of infectious and invasive diseases (eimeriosis).

Materials and methods

The studies were carried out in 2019 on the basis of pathological materials brought from the poultry farm from the Siyazan region. Microbiological studies were carried out in the department of avian diseases of the AzVSRI, and scatological studies were performed in the department of parasitology. The carcasses of the birds were examined by means of pathologico-anatomic autopsy, and diseases caused by opportunistic microbes and the causes of death on the farm were revealed. The experiment has revealed the changes characteristic of colibacillosis, salmonellosis, staphylococcosis and streptococcosis. In order to confirm the diagnosis, meat peptone broth (MPB) and meat peptone agar (MPA) from the tubular bone marrow of bird carcasses were inoculated into a nutrient medium and after incubation for 24 hours at 37° C, the condition of microbe's growth in a nutrient medium was checked, and transferred from MPB where the changes took place into the Endo nutrient medium, which is the medium for differential diagnosis. The main purpose of using the bismuth sulfite culture medium was to determine if the microbial culture isolated after 20-24 hours in Endo food medium was from the *E. coli* group or the *Salmonella* group. Saline and bloody MPA from the selected nutrient media were used for isolation and study the cultures of *Staphylococci* and *Streptococci*.

Materials (samples of faeces) collected for determining the presence of *Eimeria* in birds were examined scatologically using the Darling-Fullborn method. The samples were centrifuged at 1500 rpm for 5 min. A solution of saturated sodium chloride was added to the sediment in a ratio of 1:10, got mixed, and then centrifuged again. A small drop was taken from the upper layer of the suspension using a metal loop, examined and observed through a microscope, and infection was determined. Postmortem examination of dead bird carcasses revealed hemorrhages in the intestines, and microscopic examination of scrapings taken from the intestines revealed *Eimeria* oocysts.

Results and discussion

Keeping and increasing the productivity of birds depends on the well-being of poultry farms in regard with infectious and invasive diseases, on disease and death of birds, the timely identification of the reasons for the drop in productivity, and on the development and implementation of scientifically grounded measures to control them.

It should be noted that after the transition of poultry farming to a farm basis, and as per our research, we have determined the epizootic situation of the disease, the

spread of the disease, the factors contributing to their occurrence, the peculiarities of the mixed course of infectious and invasive diseases. To determine the reasons of the diseases caused by opportunistic microbes and eimeria, and the causes of mortality of birds at the poultry farm, postmortem examinations were carried out in more than 250 bird carcasses. As a result, characteristic changes of colibacillosis, salmonellosis, streptococcosis, staphylococcosis and eimeriosis were revealed. To confirm the diagnosis, bacteriological and scatological examinations of tubular bone marrow, feces samples, and intestinal scrapings were carried out in 65 carcasses of 35-day-old birds and 60 carcasses of 55-day-old birds. As a result of the study, we isolated the causative agents of the above diseases from the carcasses of 35-day-old birds. Out of these study groups/cases, we detected the results as follows:

Escherichia coli in 11 birds (17.0%), *Salmonella enteritidis* in 28 birds (43.0%), *Staphylococcus pyogenes aureus* in 4 birds (6.1%), *Streptococcus faecalis* in 3 birds (4.6%), *Eimeria acervulina* in 5 birds (7.7%), *Eimeria tenella* in 8 birds (12.3%), *E. mitis* in 6 birds (9.2%), *E. maxima* in 5 birds (7.7%) were detected. *Escherichia coli* in 10 birds (16.6%), *Salmonella enteritidis* in 20 birds (33.3%), *Staphylococcus pyogenes aureus* in 3 birds (5.0%), *Streptococcus faecalis* in 6 birds (10.0%) from the tubular bone marrow of 55-day-old bird carcasses and *Eimeria acervulina* in 4 birds (6.6%), *E. tenella* in 7 birds (11.6%), *E. mitis* in 5 birds (8.3%) and *E. maxima* 3 in birds (5.0%) from intestinal pruritus, and during the scatological examination of samples of faeces *Eimeria acervulina* in 4 birds (6.6%), *E. tenella* in 7 birds (11.6%), *E. mitis* in 5 birds (8.3%) and *E. maxima* 3 in birds (5.0%) (Table 1).

Thus, bacteriological and scatological examinations of pathological materials of 135 dead chicks revealed opportunistic pathogenic microbes and eimeria. Our research plays a key role in determining the prevalence of infectious and invasive diseases (colibacillosis, salmonellosis, staphylococcus, streptococcosis and eimeriosis) in poultry farms. As a result, research will have a positive impact on the profitability of farms by preventing the level of microbial contamination of hatching eggs, incubators, feed and air in poultry buildings. Therefore, it is important for farms to comply with the requirements of veterinary and sanitary regulations at all stages of production.

Table 1. Results of examination of pathological materials

Age of birds	Examined	Causative agents		%	
		Infected			
35-day old	65	<i>Escherichia coli</i>	Infected	11	17,0
		<i>Escherichia coli</i>	%		
35-day old	65	<i>Salmonella enteritidis</i>	Infected	28	43,0
		<i>Salmonella enteritidis</i>	%		
35-day old	65	<i>Staphylo-coccus pyogenes aureus</i>	Infected	4	6,1
		<i>Staphylo-coccus pyogenes aureus</i>	%		
35-day old	65	<i>Strepto-coccus faecalis</i>	Infected	3	4,6
		<i>Strepto-coccus faecalis</i>	%		
35-day old	65	<i>Eimeria acerulina</i>	Infected	5	7,7
		<i>Eimeria acerulina</i>	%		
35-day old	65	<i>Eimeria tenella</i>	Infected	8	12,3
		<i>Eimeria tenella</i>	%		
35-day old	65	<i>Eimeria mitis</i>	Infected	6	9,2
		<i>Eimeria mitis</i>	%		
35-day old	65	<i>Eimeria maxima</i>	Infected	5	7,7
		<i>Eimeria maxima</i>	%		
55-day old	60	<i>Escherichia coli</i>	Infected	10	16,6
		<i>Escherichia coli</i>	%		
55-day old	60	<i>Salmonella enteritidis</i>	Infected	20	33,3
		<i>Salmonella enteritidis</i>	%		
55-day old	60	<i>Staphylo-coccus pyogenes aureus</i>	Infected	3	5,0
		<i>Staphylo-coccus pyogenes aureus</i>	%		
55-day old	60	<i>Strepto-coccus faecalis</i>	Infected	6	10
		<i>Strepto-coccus faecalis</i>	%		
55-day old	60	<i>Eimeria acerulina</i>	Infected	4	6,6
		<i>Eimeria acerulina</i>	%		
55-day old	60	<i>Eimeria tenella</i>	Infected	7	11,6
		<i>Eimeria tenella</i>	%		
55-day old	60	<i>Eimeria mitis</i>	Infected	5	8,3
		<i>Eimeria mitis</i>	%		
55-day old	60	<i>Eimeria maxima</i>	Infected	3	5,0
		<i>Eimeria maxima</i>	%		

Conclusion

1. During the examination of 35-day-old bird carcasses, the following causative agents of infectious diseases were detected: *Escherichia coli* in 11 birds (17.0%), *Salmonella enteritidis* in 28 birds (43.0%), *Staphylococcus pyogenes aureus* in 4 birds (6.1%), *Streptococcus faecalis* in 3 birds. (4.6%), *Eimeria acervulina* from 5 birds (7.7%), and out of invasive diseases, the causative agents of Eimeria: *E. tenella* in 8 birds (12.3%), *E. mitis* in 6 birds (9.2%), *E. maxima* in 5 birds (7.7%).

2. Examination of 55-day-old bird carcasses has identified the following causative agents of infectious diseases: *Escherichia coli* in 10 birds (16.6%), *Salmonella enteritidis* in 20 birds (33.3%), *Staphylococcus pyogenes aureus* in 3 birds (5.0%), *Streptococcus faecalis* in 6 birds. (10.0%), and out of invasive diseases, the causative agents of Eimeria: *Eimeria acervulina* in 4 birds (6.6%), *E. tenella* in 7 birds (11.6%), *E. mitis* in 5 birds (8.3%) and *E. maxima* in 3 birds (5.0%).

References

- Borisenkova, A.N., Novikova, O.B. & Varyukhin, A.V.** (2011). The effectiveness of the use of new antibacterial agents in the industrial poultry industry. J., Veterinary Medicine, 6: 18-19.
- Lesnichenko, I.Yu. & Emaluyev, S.V.** (2011). Modern drugs for the prevention and treatment of bacterial diseases of birds. J., Veterinary Medicine, 2: 15-16.
- Mikayilov, M.S.** (2014). Susceptibility of colibacillosis and salmonellosis pathogens to antibiotics in poultry farms. Baku. Scientific works of the Institute of Microbiology of ANAS, 12 (1): 189-193.
- Mikayilov, M.S & Mammadova, S.** (2014). Associative infection of birds with eimeriosis and infectious diseases. Scientific works. Nakhchivan, 4 (60): 143-147.
- Musayev, M.A., Hajiyeu, A.T, Yolchiyev, Y.Y., Vahidova, S.M. & Mustafayeva, Z.A.** (1991). Poultry parasites in Azerbaijan and the scientific basis of their control. Baku, Science, 41-51.
- Mirzakov, R.R. & Tashbulatov, A.A.** (2011). Kenocox Cleaner is an effective drug against coccidia oocytes. Veterinary, 9: 36-40.
- Nakhmanson, V.M. & Burba, L.G.** (1990). Differential diagnosis of infectious animal diseases. Moscow, 239-241.