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Histopathological Study on Poultry Enteritis in Azerbaijan Province of Iran

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Abstract: In this survey, for morphohistopathological study of the enteritis in fowls, 70 specimens of pathologic intestinal lesions were randomly collected from necropsied fowls with the signs of enteritis from different flocks at Tabriz poultry clinics in a course of 6 months. They subjected to detail morphological and histological studies. Epidemiologically, the prevalence of the various kinds of enteritis in association with age, strain and sex was evaluated. One-sample chi-square test, revealed that the highest rate of occurrence (78.57%), belonged to broilers ($p < 0.01$). It was observed greatly in 4-6 weeks of age ($p < 0.01$). Also, by chi-square test, a significant relation between the sex and age of affection confirmed ($p < 0.01$), as in the males the most of affliction belonged to 4-6 weeks of age and in the females it was 1-3 weeks of age. Histopathologically, we found that the highest rates of enteritis, related to catarrhal, hemorrhagic and necrotic enteritis respectively ($p < 0.01$). This investigation demonstrated that the strain of Ross was likely in high risk ($p < 0.05$). The relation between the strains and the kinds of enteritis was not significant.

Key words: Poultry, enteritis, histopathology, Tabriz

INTRODUCTION

Most of the inflammatory disease involves gastrointestinal tract (George *et al.*, 1982; Gupta *et al.*, 1990). Based on gastrointestinal important role in digestion and absorption of food, any disturbance such as enteritis in this area yields to disorders in absorption and finally results in decrease in growth, production loss, increase in FCR and waste (Ficken and Wages, 1997). Enteritis or inflammatory bowels disease results from viral and bacterial disease and most of the parasitic infections and use of some poisons. Based on its multifactorial causative agents, assessment of these factors because of their effects on gastrointestinal tract is important. Therefore, because of importance of this matter, in this study tried to detection and dissolving this disorder.

MATERIALS AND METHODS

In this study that were done at a six month period with referring to poultry clinics in the East Azerbaijan, several samples were obtained from several parts of afflicted poultry bowels. For this reason, carcasses from each flock in same and identical amounts were obtained. In prior of the study, history such as age, sex, race, daily losses, total flock losses and about used drugs and vaccines were taken. In next stage of study, samples were obtained from affected carcasses. Samples were obtained from areas that showed macroscopic sings such as diarrhea, hyperemia, Intestinal swelling and

distention, gaseous bowel, increase in intestines thickness, changes in color and consolidation of digesta and also abnormal masses. Samples were obtained from both safe and affected areas. Obtained samples were put into formalin 10% as fixator. Then to preparing the histopathologic slides, samples were transferred to histopathology laboratory of veterinary faculty, Islamic Azad University, Tabriz branch. In lab, samples were passaged and stained by H&E method (Kaldhusdal and Lovland, 2000). The number of samples was 70. Obtained data were analyzed by One-Sample Chi-Square Test.

RESULTS

In macroscopic study all parameters that mentioned previously were exerted. Frequency and incidence rate in different affected chicks from age, sex and race aspect are showed in Table 1-5. Also microscopically, frequency of 70 obtained samples is showed in Table 6. Maximum frequency (78.52%) was observed in broiler chickens and in this mean maximum incidence rate (21.83%) was belonged to 6 weeks old chickens. Among different races, maximum cases (45.71%) were belonged to Ross and were observed about 52.86% and 47.145 in male and females respectively. Microscopically, maximum rate (51.43%) was observed in catarrhal types of enteritis. In comment of data by Chi-Square Test observed that maximum frequency in broiler chickens was significant than other flocks ($p < 0.01$) and

Table 1: Frequency and percentage of incidence rate in different flocks

	Broiler	Layer	Layer breeder	Broiler breeder	Sum
Frequency (flock)	55	12	2	1	70
Percent	78.57	17.14	2.84	1.43	100

Table 2: Frequency and percentage of incidence of intestinal damages in broilers based on flock age

	Age (week)									Sum
	1	2	3	4	5	6	7	8	9	
Frequency (flock)	3	0	11	11	7	12	8	2	1	55
Percent	5.45	0	20	20	12.73	21.83	14.54	3.64	1.82	100

Table 3: Frequency and percentage of incidence of intestinal damages in layers based on flock age

	Age (month)								Sum
	2	4	5	7	15	16	18	19	
Frequency (flock)	1	3	2	1	1	1	1	2	12
Percent	8.33	25	16.67	8.33	8.33	8.33	8.33	16.67	100

Table 4: Frequency and percentage of incidence in different races

	Race								Sum
	Ross	Cobb	Hyline	Rbrakz	Color chicks	Lohman	Hubbard	Native	
Frequency (flock)	32	12	10	9	4	1	1	1	70
Percent	45.71	17.14	14.29	12.86	5.71	1.43	1.43	1.43	100

Table 5: Frequency and percentage of incidence in sex

	Sex		Sum
	Male	Female	
Frequency (chicks)	37	33	70
Percent	52.86	47.14	100

Table 6: Frequency and percentage of enteritis based on microscopic studies

	Type							
	Catarrhal	Hemorrhagic	Necrotic	Coccidiosis	Ulcerative	Marek	Leucosis	Gangerian
Frequency	36	12	11	4	2	2	2	1
Percent	51.43	17.14	15.71	5.71	2.84	2.84	2.84	1.43

in 4-6 weeks old chickens was more than other ages ($p < 0.01$). Also by Chi-Square Test one significant relationship were observed between sex and age of incidence. In this relationship it was found that in males, most of the sufferance (64.9%) was in 4-6 weeks old and in females most of the sufferance (42.1%) was in 1-3 weeks old range. Also was observed that catarrhal type of enteritis and in the next degrees hemorrhagic and necrotic types have more incidence rate ($p < 0.01$).

Microscopic studies results: In the study of the obtained results following cases were observed:

Catarrhal enteritis: This disorder diagnosed by necrosis of most of the enterocytes, increase in mucosa by goblet cells, invasion of inflammatory cells such as lymphocytes and heterophils in the lamina propria, hyperemia, villous atrophy and crypts hyperplasia and often cystic distension of crypts (Fig. 1). In some cases thrombosis with bacterial colonies was observed in the lamina propria vessels (Fig. 2).

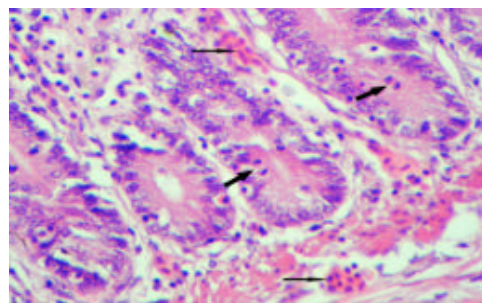


Fig. 1: Mitosis in the epithelium crypts (thick arrow) and hyperemia in the lamina propria and submucosal layer are obvious (H&E, 120x)

Necrotic enteritis: This disorder diagnosed by necrosis of the villous apex and infiltration of the inflammatory cells between the necrotic tissue and safe tissue margin and also formation of diphtheria membrane consisted of necrotic tissues of villous and fibrin and degenerative inflammatory cells (Fig. 3).

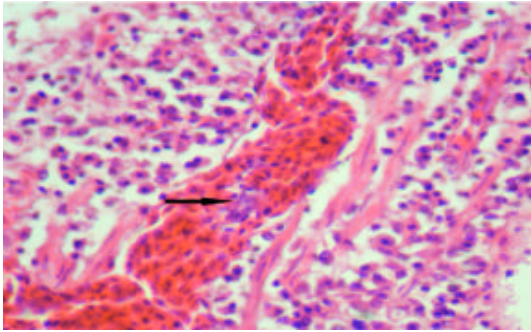


Fig. 2: Bacterial colonies are obvious (arrows) in the vessels of lamina propria (H&E, 120x)

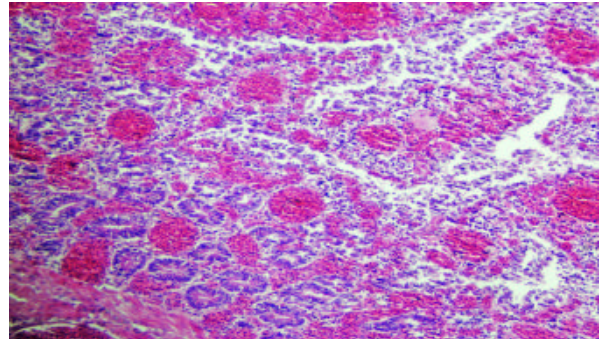


Fig. 5: Existence of the coccidial bodies (arrows) with epithelial cells necrosis of crypts is obvious (H&E, 120x)

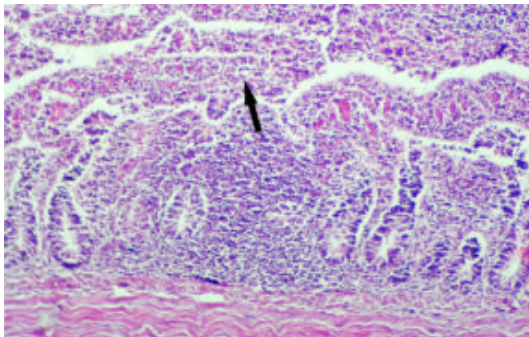


Fig. 3: Cover from diphtherial membrane (arrow) consists of necrotic villous and degenerative cells are obvious (H&E, 60x)

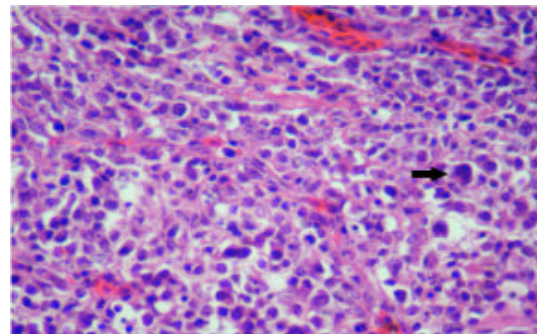


Fig. 6: Microscopic view of the acute Marek. Dark cells in the right side (arrow) are Marek disease cells. (H&E, 120x)

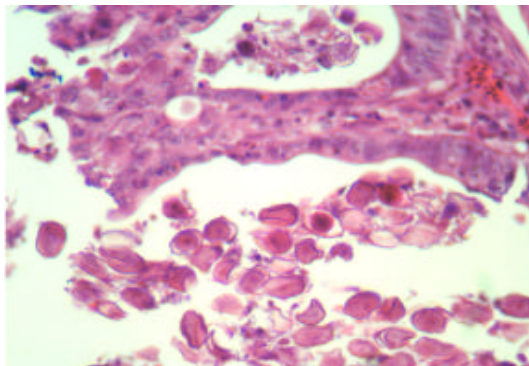


Fig. 4: Destruction of the intestinal villous, damages of the vessels and hemorrhage are obvious (H&E, 20x)

Hemorrhagic enteritis: Hemorrhagic enteritis is acute form of catarrhal enteritis. By destruction of the villous, vessels damages and hemorrhage were observed. Lamina propria was severely injured and hemorrhage from the vessel existed in the tip of the villous was obvious. In some cases, muscular layer was severely damaged and infiltration of inflammatory cells was observed (Fig. 4).

Ulcerative enteritis: This disorder is defined by extension of damage to submucosal layer and necrosis of the afflicted areas. Injuries often were extended into muscular layer and infiltration of the inflammatory cells such as heterophils was obvious. In some cases, bacterial colonies also were showed.

Gangrenous enteritis: In these cases, invagination of one part into other part was obvious. This disorder was defined by ischemic necrosis of tissues, congestion, mucosal and submucosal layers edema with infiltration of the inflammatory cells and saprophyte microbial agents invasion.

Coccidial enteritis: Was defined by necrosis, destruction and hemorrhage of the lamina propria and sever damages of the muscular mucosa with existence of the coccidial bodies (Fig. 5).

Lymphoproliferative enteritis: This form was defined as two forms: Visceral leucosis and acute Marek (Fig. 6).

DISCUSSION

In most of the poultry disease, intestinal damages has been mentioned as macroscopic form, therefore,

detection of the causative agents of enteritis by macroscopic way is difficult (Jolly and Mechery, 1996; Maxey and Page, 1977). This study was conducted by both microscopic and macroscopic methods. In one study by Ito *et al.* (2004), demonstrated that broiler chickens are suffered more than others to enteritis. Same results were reported by Lee *et al.* (2002). These results are compatible with our research results (Ito *et al.*, 2004; Lee *et al.*, 2002). Catarrhal enteritis is a one common and non-specific finding and is a one common response of intestine to most of the pathogen agents against viruses, bacteria, toxins, parasites, inappropriate nutritional conditions and other pathogens that may be extent and yields to hemorrhagic enteritis, atrophic enteritis, cystic enteritis and necrotic enteritis (Calnek, 2001; George *et al.*, 1982; Gupta *et al.*, 1990; Jolly and Mechery, 1996). Hemorrhage of the gastrointestinal of poultry by vitamin K deficiency, mycotoxicosis and poisoning with sulfonamides also has been reported (Ficken and Wages, 1997; George *et al.*, 1982; Gupta *et al.*, 1990; Hoerr, 1998; Hoerr, 2001; Jolly and Mechery, 1996; Osborne *et al.*, 1982). Same injuries in the experimental deficiency of thiamine, riboflavin, pantothenic acid and niacin in the poultry have been reported (Gries and Scott, 1972; Prescott and Baggot, 1993). Newcastle disease and influenza viruses can be cause necrosis and hemorrhage in the intestinal lymphatic tissue (Cheville *et al.*, 1972; Jungherr *et al.*, 1986). In septicemias also intestines were involved that catarrhal enteritis has been seen in the pastorellosis septicemia (Bickford *et al.*, 1983; Calnek, 2001; George *et al.*, 1982; Jolly and Mechery, 1996). In chickens that were infected experimentally to salmonellosis, heterophils were infiltrated into the lamina propria and then were migrated into the intestinal lumen (Turnbull and Snoeyenbos, 1984). In the adult poultry, salmonella pullorum can be cause erosive enteritis (Calnek, 2001; Dougherty, 1981; George *et al.*, 1982; Jolly and Mechery, 1996). Coronavirus, reovirus, rotavirus, parvovirus, enterovirus, calicivirus and adenovirus are extracted from intestine of chickens with infectious growth reduction syndrome (Calnek, 2001; Kisary *et al.*, 1984; McFerran *et al.*, 1983; McNulty *et al.*, 1989; McNulty *et al.*, 1984; Wyeth *et al.*, 1981). Based on mentioned subjects it can be conclude that enteritis in the poultry isn't a specific sign of one disorder and is one common sign of most of the disease. Thus suggested that:

- 1 Minimizing the pathogens through regarding the biosecurity and sanitizing the drinking water.
- 2 Regarding the management notices.
- 3 Enhancement of the chicken's resistance by selection the disease-resistant races, controlling the immunosuppressive disease, appropriate vaccination against common disease and use of the vitamins, electrolytes and probiotics.

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