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Prevalence of Fowl Adenovirus Infection in Broilers and Kadaknath Birds in Malwa Region of Madhya Pradesh

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Abstract

A study was conducted to study the prevalence of Fowl adenovirus infections in broilers and Kadaknath birds in Malwa region of Madhya Pradesh during July 2016- March 2017. Overall 2.78% mortality was recorded at 30 broiler farms. Total mortality recorded at Kadaknath farms was 6.84%. Age-wise highest mortality in broiler farms was recorded at 3rd week of age and highest mortality was recorded at 1st week and 3rd week of age respectively at Mhow and Jhabua kadaknath farms. Disease-wise highest mortality in broilers was recorded due to IBH-HPS (1.6%) followed by colibacillosis. At Kadaknath farm Mhow and Jhabua maximum mortality was recorded due to yolksac infection (2.83%) and coccidiosis (1.90%) respectively.

Introduction

The inclusion body hepatitis–hydropericardium syndrome (IBH–HPS) associated with FAdV has been reported to occur in broilers as well as layers throughout the world (Balamurugan and Kataria, 2004). In the past two decades several disease outbreaks have been recorded from poultry flocks of different states and regions of India, causing severe economic losses to the poultry owners and the industry (Kumar *et al.,* 2010 and Kataria *et al.,* 2013). Recent work has demonstrated that virulent strains have emerged which alone can produce the severe disease with mortality ranging from 10-30% which may reach up to 80% in presence of other immunosuppressive factors (Hafez, 2011). Kadaknath is an indigenous poultry breed and considered to have greater immunity against infectious diseases. In the recent past carcases of kadaknath birds have been received in the department of pathology showing extensive liver lesions. So the present study was planned with the objective to study the prevalence of inclusion body hepatitis (IBH) and hydropericardium syndrome (HPS) in broilers and Kadaknath birds.

Material and Methods

The present study was conducted in the department of veterinary pathology of the College of Veterinary Science and A.H. Mhow. This study comprised of recording the incidence of mortalities in broilers aging between 3-6 weeks. A total of 30 broiler farms located in and around Indore district, Kadaknath farm in college of veterinary science and animal husbandry, Mhow and Government Kadaknath farm, Jhabua were selected. The mortalities were attended as and when reported and information like age, breed, management system, flock size, clinical signs, age at which mortality started and duration of mortality were recorded. On the basis of farm history, clinical signs, mortality pattern and gross lesions the total mortality was categorized age-wise and disease-wise. Mortalities at selected poultry farms were recorded and subjected to detailed postmortem examination. Mortalities in kadaknath birds were recorded from first week of age to seven weeks. After recording the gross lesions, tissue samples from affected livers were collected in 10% buffered formalin for histopathology and demonstration of intra nuclear inclusion bodies in hepatocytes. The liver tissues were processed by routine method of dehydration in graded alcohol, clearing in xylene and embedding in paraffin. Sections of 4-5 micron thickness were processed by conventional procedures using routine Haematoxylin and Eosin for histopathological studies.

Results and discussion

In the present study 30 broiler farms located in and around Indore district have been selected where high mortalities between 2-5 weeks of age were reported. History from the broiler farm owners revealed that the flock size at different farms varied from 1200 – 4300 birds and all the birds were reared on deep litter system. The clinical signs observed in the affected farms were anorexia, dullness, ruffled feathers, reluctance to move prostration and death. Matos *et al.* (2016) compared the pathology and pathogenesis of IBH caused by FAdVs in SPF broilers and SPF layers and concluded that higher clinical sign scores including high mortality were shown by broilers than layers. On the basis of symptoms and gross lesions, diseases diagnosed and mortality recorded in broilers are presented in Table 1.

Table 1: Disease-wise mortality at different broiler farms (n= 64650)

Disease	Mortality	% mortality
Colibacillosis	465	0.72%
Chronic Respiratory Disease	79	0.12%
Coccidiosis	137	0.21%
IBH-HPS	1062	1.64%
Miscellaneous	55	0.08%
Total	**1798**	**2.78%**

The highest mortality was recorded due to IBH-HPS followed by colibacillosis, coccidiosis, chronic respiratory disease and miscellaneous diseases. Out of 30 broiler farms, only three farms were found positive for IBH-HPS on the basis of symptoms and lesions, constituting the overall prevalence of 30%. Total mortality due to IBH-HPS on these broiler farms is presented in Table 2. No other concurrent disease was observed on FAdV affected broiler farms except IBH-HPS.

Table 2: Total mortality due to IBH-HPS at three positive broiler farms

S.No	Farm	Mortality due to IBH-HPS	Percent Mortality
1.	I (n=2200)	369	16.77%
2.	II (n=2300)	471	20.48%
3.	III (n=2200)	222	10.09%
Total	**6700**	**1062**	**15.85%**

Total mortality in IBH-HPS affected broiler farms was recorded to be 15.85%. Similar results were reported from different regions of India due to IBH-HPS infection in broilers by many workers (Chandra *et al.,* 2000; Sawale *et al.,* 2012 and Kumar *et al.,* 2013). Sawale *et al.* (2012) reported Inclusion body hepatitis (IBH) - hydropericardium syndrome (HPS) in commercial broiler chickens of 15-37 days age with mortality ranging from negligible to as high as 10%. On the basis of clinical signs and post mortem examination Kumar *et al.* (2013) reported outbreaks of inclusion body hepatitis (IBH) in Uttar Pradesh and Uttarakhand. Mortality due to IBH-HPS in the present study was in accordance with the findings of other scientists in different countries (Memon *et al.,* 2006; Nakamura *et al.,* 2011; Rahimi and Haghighi, 2015; Gawel *et al*., 2016 and Niu *et al.,* 2018) who have reported the mortality rate to be

Fig. 1 : Hydropericardium with clear fluid in the pericardial sac and hepatitis in broiler affected with FAdV

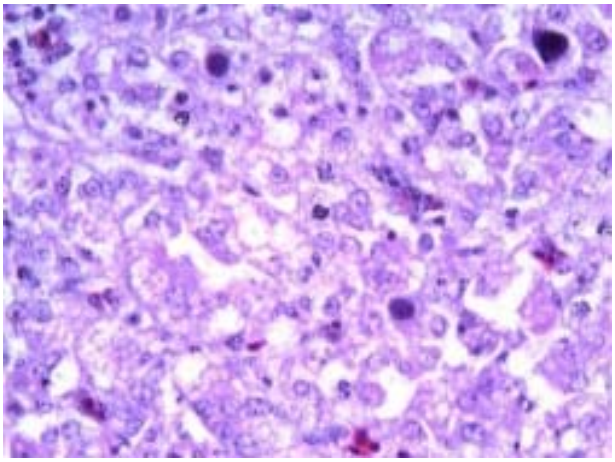

Fig. 2 : Microscopic section of liver showing basophilic intranuclear inclusion bodies (arrow) in broilers affected with FAdV (H & E 40X)

as low as 1.2% to as high as 17% in broilers. Comparatively low mortality in the present study is due to uncomplicated infection of IBH-HPS in broilers. Although other infections like colibacillosis, CRD, coccidiosis were recorded at other different broiler farms and constituted an overall mortality of 2.78%. Earlier Toro *et al.* (2000) reported IBH-HPS to be associated with immunosuppressive diseases like IBD and CIA however Gomis *et al.* (2006) reported IBH without any immunosuppressive predisposition and the results of the present study was in accordance with the later workers as no involvement of any other infectious agent was identified and the lesions were only due to IBH-HPS. Gross lesions observed in FAdV affected broilers were hydropericardium and hepatitis (Fig.1). The liver of FAdV affected broilers were enlarged, swollen and congested with focal haemorrhagic areas. In few cases, pale friable liver with petachial haemorrhages were observed**.** Histopathological changes in liver were characterized by severe congestion and vacuolar degeneration. Characteristic basophilic intra-nuclear inclusion bodies were seen in many hepatocytes (Fig.2). Varying degrees of degenerative changes were seen which included swollen hepatocytes, infiltration of heterophils and lymphocytes and focal areas of necrosis. Gross lesions observed in the present investigation were in accordance with the lesions reported by previous workers (Philippe *et al.,* 2005; Sawale *et al.,* 2012 and Thakor *et al.,* 2012).

Mortality pattern at Government Kadaknath farm Jhabua and College of Veterinary Science and Animal Husbandry, Mhow were recorded from 1-7 weeks of age. On the basis of symptoms and gross lesions the incidence of different disease conditions are presented in Table 3. At these two Kadaknath farms no incidence of IBH-HPS was recorded. Total mortality recorded up to 7 weeks of age at Mhow and Jhabua farms were 7.51% and 6.35% respectively. Highest mortality was recorded due to yolk sac infection followed by colibacillosis, coccidiosis and rickets.

Table 3 : Disease-wise mortality at Kadaknath farms

Disease	Mhow (n=1236)	Jhabua (n=1834)
Yolk sac infection	35 (2.83%)	27 (1.47%)
Colibacillosis	22 (1.78%)	26 (1.41%)
Rickets	15 (1.21%)	08 (0.43%)
Coccidiosis	17 (1.37%)	35 (1.90%)
Miscellaneous	04 (0.32%)	21 (1.14%)
Total	**93 (7.51%)**	**117 (6.35%)**

Mostly, IBH-HPS is considered as disease of broilers, but Chandra *et al*,. (2000) reported hydropericardium in domestic fowl (layers) with mortality up to 10%. In the present investigation IBH-HPS was not observed in Kadaknath birds.

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Conflict of Interest:

All authors declare no conflict of interest.

References:

Balamurugan, V and Kataria, J.M. (2004). *The hydropericardium syndrome in poultry—a current scenario. Veterinary Reserch Communication,* **28**: (2) 127–148.

Chandra, R., Shukla, S.K. and Kumar, M.(2000). The hydropericardium syndrome and inclusion body hepatitis in domestic fowl. *Tropical Animal Health Production*, **32 (2)**: 99-111.

Christensen, M.H. and Saifuddin, M. (1989). A primary epidemic of inclusion body hepatitis in broilers, *Avian Diseases,* 33 (4): 622-630.

Gawel, A., Nowak, M., Ciputa, R and Bobrek, K. (2016). Prevalence of inclusion body hepatitis (IBH) in Poland from 2010-2014. *Polish Journal of Veterinary Sciences,* **19**(4): 889–89.

Gomis, S., Goodhope. R., Ojkic, D. and Willson, P. (2006). Inclusion body hepatitis as a primary disease in broilers in Saskatchewan, Canada, *Avian Diseases,* **50**(4): 550-555.

Hafez, M.H. (2011). Avian adenoviruses infections with special attention to inclusion body hepatitis/ hydropericardium syndrome and egg drop syndrome. *Pakistan Veterinary Journal*, **31**(2): 85-92.

Kataria, J.M., Dhama, K., Nagarajan, S., Chaktaborty, S., Kaushal, A. and Deb, R. (2013). Fowl adenoviruses causing hydropericardium syndrome in poultry. *Advances in animal and veterinary science,* **1**(4S): 5-13.

Kumar, V., Kumar, R., Chandra, R., Bhatt, P. and Dhama, K. (2010). Outbreaks of inclusion body hepatitis (IBH) in chickens. *Advances in Animal and Veterinary Sciences*, **1**(3S): 21-24.

Kumar, V., Kumar, R., Chandra, R., Bhatt, P. and Dhama, K. (2013). Outbreaks of Inclusion Body Hepatitis (IBH) in Chickens; Pathological Studies and Isolation of Fowl Adenovirus. *Advances in Animal and Veterinary Sciences*, **1**(3S): 21 – 24.

Matos, M., Grafl, B., Liebhart, D., Schwendenwein, I. and Hess, M. (2016). Selected clinical chemistry analytes correlate with the pathogenesis of inclusion body hepatitis experimentally induced by fowl aviadenoviruses. *Avian Pathology*, **45**(5): 520-29.

Memon, Z.N., Gachal, G.S., Yusuf, M. and Arian, M.A. (2006). Incidence of hydropericardium syndrom disease in broilers of Hyderabad, Sindh. *International Journal of Poultry Sciience,* **5**(7): 673–676.

Nakamura, K., Mase, M., Yamamoto, Y., Takizawa, K,, Kabeya, M., Wakuda, T., Matsuda, M., Chikuba, T., Yamamoto, Y., Ohy-ama, T., Takahashi, K., Sato, N. Akiyama, N., Honma and H, Imai. (2011). Inclusion body hepatitis caused by fowl adeno-virus in broiler chickens in Japan 2009–2011. *Avian Diseases,* **55:** 719–723.

Niu, Y., Sun, Q., Zhang, G., Sun, W., Liu, X., Xiao, Y., Shang, Y. and Liu, S. (2018). Epidemiological investigation of outbreaks of fowl adenovirus infections in commercial chickens in China. *Tundry Emerging Diseases*, **65**:121–126.

Philippe, C., Grgic, H. and Nagy, E. (2005). Inclusion body hepatitis in young broiler breeders associated with a serotype 2 adenovirus in Ontario, Canada. *Journal of Applied Poultry Research,* **14**:588–593.

Rahimi, M. and Haghighi, Z.M.S. (2015). Adenovirus-like inclusion body hepatitis in a flock of broiler chickens in Kermanshah province, Iran. *Veterinary Research Forum*, **6**(1): 95–98.

Sawale, G.K., Gupta, S.C., Srivastava, P.K., Sabale, S.S., Ingole, K.H., Pawale, N.H. and More, B.K. (2012). Inclusion body hepatitis–hydropericardium syndrome in commercial broiler chickens*Indian Journal of Veterinary Pathology*, **36**(2): 255–257.

Thakor, K.B., Dave, C.J., Prajapati, K.S., Fefar, D.T. and Jivani, B.M. (2012). Molecular characterization of avian adeno virus causing inclusion body hepatitis–hydropericardium syndrome in broiler chickens of Anand, Gujarat, India. *Veterinary World*, **5**: 178–182.

Toro, H., Gonzalez, C., Cerda, L., Hess, M., Reyes, E. and Geissea, C. (2000). Chicken anemia virus and fowl adenoviruses: Association to induce the inclusion body hepatitis/hydropericardium syndrome. *Avian Diseases,* **44**: 54-58.

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