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Incidence of Hydro Pericardium Syndrome Disease in Broilers of Hyderabad, Sindh

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Abstract: Hydro pericardium syndrome (HPS) is an important, recently emerged, disease of poultry, particularly of 6-week-old broiler chicks, characterized by its sudden onset, with high mortality ranging from 20-70%, typically hydro pericardium and mottled and friable livers, with intranuclear inclusion bodies in the hepatocytes. The liver of the infected birds shows necrotic foci and basophilic intranuclear inclusion bodies in the hepatocytes and pinpoint white foci in the pancreases and ventricular erosions in broilers. The disease has been controlled by the use of formaline-inactivated vaccines, prepared from infected liver homogenate and of inactivated cell culture vaccines. The present study was conducted to determine the incidence of hydro pericardium syndrome disease at different broiler farms of Hyderabad district. Data were collected between 1999 to 2001 from 25 commercial broiler farms. The survey was made at regular intervals for the presence of Hydropericardium Syndrome disease and from the official record of the Disease Diagnostic Laboratory of Directorate of Poultry Production, Hyderabad.

Key words: Hydro pericardium syndrome, fowl adenovirus, mortality

Introduction

Broiler production has increased in country during 1997-1998, which increases to 170 million during 1998-99 (Anonymous, 1998-99). Higher demand for broiler meat in Pakistan, earlier market age and rapid returns over the invested capital have increased the popularity of broiler farming. Numerous factors like flock size, mortality, age and weight at the time broilers are marketed, hygiene, immunization, floor construction and better utilization of available facilities could affect the performance of the broilers (Farooq *et al.*, 2001). Reduction in net profit was observed when mortality level was increased from 2.5 to 10% (Kitsopanidis and Ma, 1991). Mortality plays a major role in determining the rate of income generated from broilers, mortality is the function of number of dead birds in a flock. Over all mortality in broilers flocks was representing of the broilers. The higher mortality in present study could be attributed to poor management ineffective health coverage programs and severe outbreak of hydro pericardium syndrome in the study area. The Hydro pericardium syndrome popularly called the Litchi Heart disease, primarily of broiler chickens, was first reported in Angara Goth near Karachi, Pakistan, during 1987 (Khawaja *et al.*, 1988; Gowda and Satyanarayana, 1994), and it has been reported to be particularly important in some countries in Asia and America (Jaffery, 1988; Shane, 1996; Abe *et al.*, 1998). The sudden onset of the disease and a mortality rate as high as 75% affecting the 3 to 6 week old age group and causing a severe hazard to poultry producers, particularly in the broiler industry in India and Pakistan (Gowda and Satyanarayana, 1994). The disease is caused by fowl adenovirus (FAV) serotype 4 (Jadhao *et al.*, 1997). An

inactivated vaccine was found to be efficacious in controlling the disease, (Roy *et al.*, 1999). The contagious nature of the disease, the development of a suitable vaccine in Specific pathogen free (SPF) chickens and cell culture system seems to be the best answer, with strict biosecurity and high standards of hygiene and management. More recently, vaccines propagated in oil, adjuvant vaccine prepared from the adeno-Pak strain isolated in cell culture and given to broilers of 20 days of the age also provided 100% protection against challenges at 42 days of the age (Khushi *et al.*, 1996). Clinical diagnosis of the disease before the occurrences of mortality is difficult since the birds do not show specific clinical signs. Diagnosis of the Hydropericardium Syndrome infection has been carried out on the basis of gross lesions, histopathological lesions (Gowda and Satyanarayana, 1994; Kumar *et al.*, 1997). In addition to the characteristic Hydropericardium Syndrome Nakamura *et al.* (2002) observed pinpoint white foci in the pancreas and ventricular erosions in broilers. The mortality and severity of the lesions may be greater in immunosuppressed birds.

The epidemiological factors associated with the development of spread of Hydropericardium Syndrome are unclear (Akhtar *et al.*, 1992). Proper disinfections of premises and equipment, restricted entry of visitors and vaccination crews and ventilation and proper lighting in the poultry house play a significant role in prevention of the disease (Abdul Aziz and Hasan, 1996.)

Materials and Methods

Experimental material and source of data: Three years data from 1999-2001 was collected from 25 commercial broiler farms of district Hyderabad. Five farms each were

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Table 1: No. of bird affected died and survived in the five taluka of Hyderabad District During 1999

Taluka	No of birds affected	Mean±SD	No of birds died	Mean±SD	No. of birds survive	Mean±SD
Hyderabad	178	14.83±11.58	157	13.08±10.10	21	1.75±2.80
Hala	67	5.5±2.71	60	5.00± 2.21	7	0.58±0.90
T.m khan	159	13.2±12.80	148	12.33±12.78	11	0.91±0.90
Tandoallahyar	155	12±9.85	148	12.33±9.62	7	0.58±1.08
Matyari	154	12.83±16.19	149	12.41±16.38	5	0.41±0.79

Table 2: No. of bird affected died and survived in the five taluka of Hyderabad District During 2000

Taluka	No of birds affected	Mean ±SD	No of birds died	Mean ± SD	No of birds survive	Mean± SD
Hyderabad	72	6.00± 4.00	68	5.66± 4.05	4	0.33± 0.65
Hala	39	3.250± 1.60	31	2.583 ± 1.08	8	0.667 ± 0.77
T.m khan	63	5.250± 2.73	55	4.583 ± 2.53	8	0.667 ± 0.88
Tandoallahyar	45	3.750± 2.89	41	3.417 ± 2.57	4	0.333 ± 0.49
Matyari	52	4.333± 3.05	40	3.333 ± 2.01	12	1.000 ±1.34

Table 3: No. of bird affected died and survived in the five taluka of Hyderabad District During 2001

Taluka	No. of birds affected	Mean±SD	No. of birds died	Mean ± SD	No. of birds survive	Mean ± SD
Hyderabad	52	4.333± 1.61	40	3.333± 1.55	12	1.000 ±0.85
Hala	62	5.167± 1.94	50	4.167 ± 1.40	12	1.000 ± 0.95
T.M khan	61	5.083± 1.92	46	3.833 ± 1.74	15	1.250 ± 0.86
Tando allahyar	61	5.083± 2.53	47	3.917 ± 2.15	14	1.167 ± 0.93
Matyari	48	4.000± 1.85	39	3.250 ± 1.35	9	0.750 ±0.86

randomly selected from Hyderabad, Hala, Tando Mohammad Khan, Tando Allahyar and Tando Jam to record the Hydro pericardium syndrome. The data was collected by regular survey of these farms and from the official record of the Disease Diagnostic Laboratory of Directorate of Poultry Production Hyderabad, Sindh. This data was statistically analyzed to study the year wise occurrence of Hydro pericardium syndrom disease in commercial poultry farms for following parameters.

- 1 Number of birds examined for Hydro pericardium syndrom
- 2 Number of birds affected with Hydro pericardium syndrom
- 3 Number of birds died due to Hydro pericardium syndrom
- 4 Number of birds survived from Hydro pericardium syndrom

Results and Discussion

In the present study birds were examined for Hydro pericardium Syndrome virus disease in five different cities of Hyderabad district during the study period 1999-2001. The statistical analysis of data in the year 1999, the highest no. of bird died 157 in the Hyderabad and their range is 13.08 as compared to other talukas (Table 1) and also highest no. of affected birds also recorded from the commercial broiler farms of Hyderabad city. The highest no. of birds survive in the farms of Hyderabad and their range is 1.75 as compared to other talukas (Table 1).

In the year 2000 the highest no. of birds were affected in commercial broiler farms of Hyderabad and their average is 6.00 and highest no. of birds died in same taluka (Table 2) and their mean value is 5.66 and minimum no. of birds survived in the commercial form of

Hyderabad and Tando Allayar and their average is 0.33 respectively (Table 2). In the year 2001 highest affected no. of birds were recorded from the farms of Hala (Table 3) and their range is 5.16 as compared to other farms and mortality rate is highest recorded from the farms of Hala and their range is 4.16 as compared to other farms (Table 3) and minimum no. of birds were survived in the farms of matyari taluka and their range is 0.75 as compared to other farms of the district. (Table 3) The three years data (1999-2001) shows that the highest no. of birds affected in the farms of Hyderabad in the three years study as compared to other talukas (Table 4) and highest mortality rate of the birds were recorded in the farms of Hyderabad and very low survival rate is also observed the farms of Tando Allahyar farms as compared to other farms talukas (Table 4).

The first epidemic of Hydropericardium Syndrome in broilers chicks was reported from Angara Goth near Karachi, Pakistan. In late 1987, (Jaffery, 1988; Khawaja *et al.*, 1988; Hassan; 1998), although sporadic cases were recorded as early as 1985 (Cheema *et al.*, 1989). This an endemic and economically important disease in these countries that cause huge economic loss to poultry sector owing to chick mortality and decreased productivity, since the disease has been reported from Iraq (Abdul Aziz and Al-Attar, 1991), Kuwait, Japan (Abe *et al.*, 1998), Russia (Borisov *et al.*, 1997), south and central America (Shane, 1996), Slovakia (Jantosovic *et al.*, 1991), and many other countries, advances in an understanding of the pathogenesis and control of the disease are important to poultry producers world wide (Shane, 2000). Hydropericardium Syndrome has been observed in broiler chickens (Agsar-Hasan, 1989). of either sex (Kumar *et al.*, 1997; Singh *et al.*, 1996) The virus usually affects broilers of 3 to 5 week old chicks

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Table 4: No. of birds affected died and survived due to Hydropericardium Syndrome in Five taluka of Hyderabad district During 1999-2001

Affected	Hyderabad	Hala	T.M. Khan	Tando Allahyar	Matyari	Sum	Average	SD
1999	178	67	159	155	154	713	142.6	43.36
2000	72	39	63	45	52	271	54.2	13.36
2001	52	62	61	61	48	284	56.8	6.37
Total	302	158	143	261	254	1268	253.6	51.45
Survive								
1999	157	60	148	148	149	662	132.4	40.64
2000	68	31	55	41	40	235	47	14.54
2001	40	50	46	47	39	222	40	4.72
Total	265	141	249	236	228	995	199	53.47
Survive								
1999	21	7	11	7	5	51	10.2	6.41
2000	4	8	8	4	12	36	7.2	3.34
2001	12	12	15	14	9	62	12.4	2.3
Total	37	27	34	25	26	149	37	5.35

and mortality ranges from 10 to 60 %and occasionally in layer and breeds pullets aged to 20 weeks, (Akhtar *et al.*, 1992; Javeed *et al.*, 1994; Shukla *et al.*, 1997), rare out break of Hydropericardium Syndrome in older birds/ broilers (Asrani *et al.*, 1997) and in other species of poultry including pigeons (Naeem *et al.*, 1995) has also been recorded. The course of the disease under natural conditions or following oral inoculation ranged from 7 to 15 days (Akhtar, 1995). However a liver homogenate prepared from infected birds and inoculated by the parental rout caused disease with in 2-5 days (Anjum, 1990; Kumar *et al.*, 1997), fast growing broilers were the most affected, mortality peaking on it declined giving an average mortality of 15-60% (Asrani *et al.*, 1997) but high rate of mortality 60-70% occur in Pakistan. 10-30 in Iraq and 10-60% in India are only characteristics of Hydropericardium Syndrome (Abe *et al.*, 1998). Studies on the epidemiological factors associated with development and spread of Hydropericardium Syndrome in broiler flocks in Pakistan indicated that flocks that were visited frequently by vaccination crews were 15 times more likely to be affected by the Syndrom than flocks that had no visits (Akhtar *et al.*, 1992) and also that the use of electricity as the source of light and heat entailed a much lower risk of Hydropericardium Syndrome than when Kerosin oil was used for these purposes.

Clinical diagnosis of disease before occurrences of the mortality is difficult since the bird do not show specific clinical signs; clinical diagnosis of the Hydropericardium Syndrome is therefore hardly possible in spontaneous outbreak owing to its acute nature. Diagnosis of the HPS infection has been carried out on the basis of gross lesions, histopathological lesions. The polymerase chain reaction (PCR) has also been developed for the diagnosis of Hydropericardium syndrome. (Toro *et al.*, 1999; Dahiya *et al.*, 2002; Ganesh *et al.*, 2002) Balamurugan *et al.* (2002) detected viral antigen in various tissues (Liver, Kidney, bursa of fabricus, spleen and thymus). As the Hydropericardium Syndrome agent is highly pathogenic, it rapidly spreads horizontally and

laterally among the broilers. From the economic and welfare standpoint, it is a threat to the poultry industry particularly the broiler industry, causing heavy mortality. The different Methodologies will have the major roles in both the diagnosis of adenovirus infection and the development of vaccines for controlling the diseases.

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