Pathomorphology and Ethnoveterinary Herbal Intervention in an Outbreak of New Castle Disease in Desi Chicken

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Abstract

An outbreak of Newcastle disease was recorded in desi chicken at Marungulam of Thanjavur District, Tamil Nadu. The farm capacity with 250 with desi chicken with age group of 14 weeks old were maintained under deep litter system. The clinical signs included anorexia, dullness, depression, ruffled feathers and dropped wings with greenish droppings. On postmortem examination petechial haemorrhages around the proventricular glands, intestinal Peyers patches, caecal tonsils and lymphoid tissue in lower eye lid were observed. Trachea revealed congestion. Histopathologically, the congestion and haemorrhages in the mucosa of proventriculus. Intestinal Peyer's patches, caecal tonsil and conjunctiva associated lymphoid tissue showed moderate lymphoid depletion. The spleen revealed lymphoid depletion with reticular cell hyperplasia and fibrinoid necrosis of blood vessels . The cloacal samples and spleen from affected birds were subjected to virological tests such as chicken embryo inoculation method, measurement of mean death time of embryo and finally by haemagglutination inhibition test and the New castle disease was confirmed. Based on clinical signs and histopathological examination and virological tests, the disease was diagnosed as New castle disease. The ethnoveterinary herbal medicine with whole plant of Phyllanthus amarus, Allium cepa, Cuminum cyminum seeds mixture was given orally along with jaggery in water was given twice a day for three days. However, all the birds were medicated with the same medicine for another two more days Death of the birds and other clinical signs related to New castle disease was controlled on 2nd and 4th day of treatment respectively. These remedies used by rural desi chicken poultry farmers was well documented regarding the successful treatment with ethnoveterinary herbal medicine with direct effect on New castle disease.

Key words: *Ranikhet disease, Native chicken, pathology, Ethnoveterinary herbal medicine*

Introduction

Ranikhet disease is a highly contagious and fatal disease for, commercial broiler chickens and wild bird species. Infected birds show gastrointestinal, respiratory and nervous signs, with mortality up to 100%. The main histologic lesions of Ranikhet disease are nonpurulent encephalomyelitis, vasculitis, lymphoid necrosis (cloacal bursa, spleen, thymus and intestinal mucosal lymphoid tissue), tracheitis and pneumonia, salpingitis, liver necrosis, cellular infiltration of pancreas, and

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conjunctivitis (Alexander and Senne, 2008). Ethnoveterinary medicine, the scientific term for traditional animal health care, encompasses the knowledge, skills, methods, practices, and beliefs about animal health care found among the members of a community (McCorkle, 1986). Ethnoveterinary medicine can be economical but its cost-effectiveness depends on many factors. Formal research will no doubt help to confirm the claims made by traditional healers with respect to the efficacy of their remedies (Matekaire and Bwakura, *2004*). In the present study, the outbreak of Ranikhet disease in native chicken rearing under deep litter system and was treated with ethnoveterinary herbal medicine at Thanjavur district of Tamil Nadu.

Materials Methods

One poultry farmer from Marungulam Village of Thanjavur district reported that about 60 birds were died. The poultry farm was visited Immediately. The disease investigation was done with history of farm capacity with 250 with native chicken with age group of 14 weeks old maintained under deep litter system. It was reported that that all the birds were vaccinated against Raniket disease with Lasota on 7th day and Infectious bursal disease vaccine on 14th day. Subsequently no vaccine was continued. The clinical signs, morbidity and mortality pattern were recorded . Necropsy was done in four birds. Gross lesions were recorded in various organs. Heart blood swab, smear, spleen, liver caecal tonsils were collected for microbiological investigations. The cloacal samples and spleen from affected birds were subjected to virological tests such as chicken embryo inoculation method, measurement of mean death time of embryo and finally by haemagglutination inhibition test. For histopathological examination, samples from liver, lungs, kidney, spleen, proventriculus, caecal tonsil, intestine, heart were collected in 10 % formalin, processed routinely and stained with hematoxylin and eosin (H&E). Based on gross lesions during necropsy, tentative diagnosis was made. All the affected birds were adviced to administer ethnoveterinary herbal medicinal mixture as follows. For 10 birds, whole plant of *Phyllanthus niruri- 50g*, native a*llium cepa pulp-5 numbers*, C*uminum cyminum* seeds -10g were taken. The above said mixture was grinded finely with jaggery and was given thrice a day for three days. All the affected birds were given with boiled C*uminum cyminum* seeds @15g / litre of water for another 5 days.

Results and Discussion

All the affected bird showed edema around the eyes and head listlessness, increased respiration, weakness, greenish diarrohea and death. The morbidity and mortality was 100 and 24 % respectively.

On necropsy, petechial haemorrhages around the proventricular glands, intestinal Peyers patches, caecal tonsils and lymphoid tissue in lower eye lid were observed. Intestine revealed patchy areas of congestion. Tracheal mucosa revealed patchy mild congestion. The lungs revealed diffuse mild congestion

and patchy areas reddish brown, firm and slightly hard to cut. The cut section of those areas sank into water. The spleen and liver revealed enlargement and congestion. Kidney revealed diffuse mild congestion and enlargement.

Histopathologically, the congestion and haemorrhages in the mucosa of proventriculus gland. Intestinal Peyer's patches, caecal tonsil and conjunctiva associated lymphoid tissue showed diffuse severe congestion, multifocal moderate haemorrhages and diffuse mild to moderate lymphoid depletion. The spleen revealed fibrinoid necrosis of blood vessels, diffuse moderate lymphoid depletion with mild reticular cell hyperplasia. Liver showed diffuse mild sinusoidal and blood vessel congestion, diffuse moderate swelling of hepatocytes with multifocal moderate hydropic degeneration and necrosis of hepatocytes, multifocal mononuclear cell infiltration around periportal areas. Intestine revealed diffuse mild hyperactivity of goblet cell with mucus exudation in the lumen and multifocal mild congestion of blood vessels. Pancreas showed diffuse mild congestion, multifocal mild mononuclear cell infiltration. Trachea showed diffuse mild congestion with multifocal mononuclear cell infiltration. Lungs revealed diffuse moderate congestion and mild edema in the parabronchial lumen and multifocal heterophilic and lymphocytic infiltration near parabronchial areas. Kidneys revealed diffuse mild congestion and intertubular mononuclear cell infiltration. Based on virological examination (chicken embryo inoculation method, measurement of mean death time of embryo and finally by haemagglutination inhibition test) of the cloacal and spleen samples from affected birds, Ranikhet disease was confirmed.

Ethnoveterinary herbal medicine was given to all clinically affected and healthy bird. On the second day of treatment, about 80 percentage of birds showed mild activeness, took feed and water. On third day greenish watery dropping was stopped. On the fourth day, all the birds showed full activeness, normal feeding and watering.

Discussion

Ranikhet disease caused a serious problem in chicken. Clinical symptoms such as edema around the eyes and head, listlessness, increased respiration, weakness were recorded. Greenish diarrohea, prostration and death in the present study could possibly due to inefficient absorption of bile in the intestine. Anorexia lead to weakness and diarrohea lead to dehydration, acute inflammatory changes in conjunctiva lead to edema and swelling of head in the present work. Similar findings were reported by Alexander and Senne, (2008). In the present study, the vascular changes such as congestion and haemorrhages in proventriculus and intestine, fibrinoid necrosis of blood vessels in spleen, diffuse moderate lymphoid depletion/ necrosis in spleen, bursa of Fabricius, Peyer's patches and caecal tonsils, subacute hepatitis, subacute tracheitis, catarrhal enteritis, subacute panceatitis , subacute interstitial nephritis and subacute pneumonia was

possibly due to Newcastle disease virus infection. Similar finding was reported by Alexander and Senne, (2008) and Nakamura *et al*. (2008). The extracts of *Phyllanthus niruri* have a wide range of pharmacological activitieslike antimicrobial, antiviral, hepato protective, antioxidant, anticancer, anti-inflammatory, antiplasmodial and diuretic. (Narendra, et al., 2012). Haribabu and Panda (1993) who proved that different levels of dietary Livol, a formulation containing Phyllanthus, modulated good immune response to Newcastle disease virus up to 20 weeks of age in layers. They found that high percentage of birds evinced protective titres and high level of immune response to Ranikhet disease vaccinations. *Allium cepa* is highly valued for its therapeutic properties. The bulb is anthelmintic, anti-inflammatory, antiseptic, antispasmodic, carminative, diuretic, expectorant, febrifuge, hypoglycaemic, hypotensive, lithontripic, stomachic and tonic (Kumar *et al*., 2010). Ethnoveterinary medicine is usually the only alternative for most of these resource-poor farmers, especially in remote, rural and hill areas, as there are almost no veterinarians working in such regions. In the absence of severe droughts, plant products with recognised medicinal properties can be collected either at no cost or obtained very cheaply (Guèye 1997). These locally available plant products are suitable for use by poultry farmers who can prepare their own remedies for their poultry. Given the foregoing considerations, it can be stated that, on the one hand, the use of EVM is obviously sustainable as it is culturally acceptable and accepted, and financially and ecologically sound; on the other hand, much of this precious knowledge is in danger of being lost or suppressed (Guèye 1999). It is concluded that freshly prepare herbal mixture of whole plant of *Phyllanthus niruri,* native a*llium cepa*, C*uminum cyminum* seeds is very effective in control of Ranikhet disease in chicken.

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