



Hemorrhagic Proliferative Proventriculitis and Gizzard Erosion in Poultry Birds

Kedar Karki

Senior Veterinary Officer Veterinary Officer, Central Veterinary Laboratory Tripureswor,
Kathmandu, Nepal

ABSTRACT

A new disease condition has emerged affecting replacement pullets. It affects the birds between 2 to 10 weeks of age. The mortality rate varies between 1 to 10% and ultimately the flock is left with creation of several small poorly feathered and pale chicks. Though it has not been possible to establish the exact cause of this condition, following three points has been taken in consideration. HPPGE is an illness that involves one or more infectious agents. The digestive tract and endocrine organs may be primary targets for these agents. The spectrum of signs or lesions are either caused by or exacerbated by nutritional, husbandry and hygienic factors. The response to the treatment is often poor but the symptomatic treatment has helped in ameliorating the mortality. Similar condition has been widely reported in broilers under various names like Malabsorption syndrome, infectious Proventriculitis, infectious runting syndrome, pale bird syndrome and stunting syndrome.

Keywords: HPP, Gizzard Erosion, Poultry Birds

INTRODUCTION

High levels of DBA's like histamine, 3HT, 5HT, histidine, dopamine, gizzerosine and serotonin, can be found in dietary constituents such as tankage fish meal, corn screening, soyabean meal, vitamin premixes, fats, poultry meal, meat and bone meal. The biogenic amines are decarboxylation breakdown products of amino acid catabolism and these amines are considered toxic to animals. The potential for biogenic amine build-up is real in animal by product meal and is the result of breakdown of the product. Histamine is produced in the poultry feed under proper temperature and moisture conditions by microbial decarboxylation of histidine. Reduced growth, poor feathering and proventricular enlargement have been associated with histamine toxicity in chickens. Histamine toxin problem in chicken generally has been associated with the intake of fish meal which contains high level of histidine.

Gizzerosine is a compound found in overheated fish meal due to interaction of caesine with histidine and acts as a factor causing gizzard erosion or ulceration in chicks. It can also be formed if the temperature of fish meal increases by incorrect handling during transportation or storage particularly in hot weather. Then gizzerosine concentration of burnt fish meal would be low because of degradation of protein. However it is also likely that fish meal with good colour, odour, taste and physical properties may contain a large enough quantity of gizzerosine.

Gizzerosine stimulates proventricular gland secretory cells to release excessive hydrochloric acid. Gizzard lesions result from the runaway digestive effects of hyperacidity. Opportunistic bacteria may subsequently colonise the nutrient rich biodebris. The cells of the glandular alveoli of the proventriculus secrete hydrochloric acids and pepsinogen (pepsin) which is a digestive enzyme required for initial digestion of proteins. Any lesion in the proventricular glands will interfere with the secretion of pepsin with subsequent impairment of protein digestion and utilisation. The results are poor production performance, unthriftiness and poor feed conversion. This could also explain why some of the birds affected with this condition pass undigested or poorly digested feed in faeces.

Mycotoxins

T2 toxin produced by fusarium is a caustic irritant. It causes necrosis of mucosa of proventriculus, gizzard and feather epithelium. Citrinin which is basically a nephrotoxin can also cause fissures in the gizzard.

Oosporein - In oosporein poisoning one may notice that the proventriculus has enlarged circumference at the isthmus and the mucosa is covered with pseudomembranous exudate (necrosis may occur at the isthmus).

Cyclopiazonic acid (CPA) - Lesions occur in proventriculus, gizzard, liver and spleen. The proventriculus is dilated and the mucosa is thickened by hyperplasia and ulceration. Mucosal necrosis may occur in gizzard.

Infectious Factors

Adenovirus - According to case reports, gizzard erosion is characterised by adenovirus intranuclear inclusion bodies in epithelial cells. Reovirus infection could be a factor in the pathogenesis of histamine associated proventricular enlargement.

A Reo virus strain (SS 412 stain) was isolated from an outbreak of proventriculitis/malabsorption of syndrome; the role of this reovirus strain in that outbreak was proven in experimental studies. Further studies have demonstrated that chicks from breeder hens which have been vaccinated with oil emulsion SS 412 virus vaccine were protected against. Proventriculitis following experimental challenge with the SS 412 reovirus strain.

Anaerobic bacteria like clostridia are sometimes found as secondary invaders resulting in either ulcerative enteritis or necrotic hepatitis. It will be interesting to study the effect of viruses also since both of them cause the lesions in the proventriculus.

Other Factors

Rather than ameliorating the effects of MAS, vitamin A caused a further reduction in body weight and bone ash according to a study. Supplementation of vitamin E significantly reduced both mortality and the effects of disease in body weight gain in an outbreak of pale bird syndrome in broiler chicks of 3 weeks. Amino acid imbalance (lysine and methionine especially), excess dietary copper sulfate, lack of dietary fibre, deprivation of food and water have also been found to be responsible for the HPPGE.

Lesions

Proventriculi lose their normal fusiform shape and normal constriction at the junction with gizzard are diffusely enlarged and have a thickened and turgid wall. Thickening of the wall is more marked upon incising the proventriculus. The proventricular glands protrude irregularly from the mucosal surface, lose their normal pattern and contain milky fluid that could be expressed with slight pressure. The gizzard is often smaller than normal and flabby. The gizzard peels off easily with haemorrhagic ulceration of the gizzard wall.

Treatment

Firstly ensure optimum space per bird in the grower house. Remove excess numbers of birds if the flock is overcrowded. Change the litter if it is saturated. Stop the use of animal protein and substitute with vegetable protein sources. Supplementation of antitoxin preparations along with high doses of vitamin E, liver tonics, digestion stimulants, antifungal and toxin binders show remarkable recovery in the flock in 5 to 7 days.

Use of Anti-degna liquor in water must be looked into?

Addition of gut acting antibiotics to check multiplication of anaerobes like clostridial bacteria. Control the hyper-acidity with antacids like ranitidine, aluminium hydroxide etc. through water: The result is quite encouraging.

It is necessary to correct the dietary amino acid balance, crude fiber level, calcium and phosphorus etc. Addition of enzymes to the feed since pancreatic activity also seems to be adversely affected in HPPGE. It is essential to establish the involvement of Reo- or adenoviruses and do the necessary amendments in the breeder vaccination schedule.

REFERENCES

1. Cause of gizzard erosion and Proventriculitis in broilers. Dr Manuel Contreras and Dr Douglas Zavieso Poultry International July 2006 pp16-20
2. J W Dorner, R J Cole, L G Lomax, H S Gosser, and U L Diener .Cyclopiazonic acid production by *Aspergillus flavus* and its effects on broiler chickens. *Appl Environ Microbiol.* 1983 September; 46(3): 698-703.
3. DISEASES OF POULTRY Martin D. Ficken, D.V.M., Ph.D., Dip. A.C.V.P., A.C.P.V. College of Veterinary Medicine North Carolina State University Raleigh, North Carolina Feed Passage in Broilers - A Complex Problem G. D. Butcher, DVM, Ph.D., A. H. Nilipour, Ph.D., R. D. Miles, Ph.D. University of Florida College of Veterinary Medicine, Gainesville, FL., Amir H. Nilipour, PhD, Director of Investigation and Quality Assurance, Grupo Melo, S.A., Panama, Republic of Panama
4. <http://www.wattnet.com/Archives/Docs/701pi36.pdf?CFID=25710&CFTOKEN=74030876> gizzard erosion Proventriculitis poultry A new disease condition has emerged affecting replacement pullets in India. - By Dr. Avinash Dhawale.

CONFLICT OF INTEREST : Nil
Received : 11.06.2015
Accepted : 19.08.2015

CITATION OF THIS ARTICLE

Kedar Karki. Hemorrhagic Proliferative Proventriculitis and Gizzard Erosion in Poultry Birds. World J. Clin. Pharmacol. Microbiol.Toxicol. Vol 1 [3] September 2015. 24-26