



Proventriculitis in Chickens

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Abstract

The proventriculus is the first part of a bird's stomach, where digestive enzymes are secreted and mixed with food before it goes to the gizzard. Proventriculus is a rod shaped glandular organ secretes hydrochloric acid and pepsinogen, where food is stored and/or starts the digestion processes with enzymes.

Proventriculitis is a diseased condition characterized by enlargement of the proventriculus and weakness of the gastric isthmus. The disease is associated with retarded growth and low feed conversion. Broiler in the slaughterhouse, during evisceration the affected proventriculus can rupture, causing the spread of its contents into the body cavity and contamination of the carcass, further increasing the incidence of condemnation and economical losses.

Several agents have been incriminated single and/or in combination, as a possible cause of proventriculitis including noninfectious causes (oral exposure to biogenic amines, mycotoxins, low dietary fiber, and high copper sulfate) and infectious causes [adenovirus, Infectious bronchitis virus (IBV), Infectious bursal disease virus (IBDV), reovirus, Marek's disease virus, Chicken proventricular necrosis virus (CPNV), clostridium and *Macrorhabdus ornithogaster* (megabacterium)]. The objective of this article is to summarize literature written about Proventriculitis to be available to students, researchers, and veterinarians in poultry practical.

Keywords: Chicken; Proventriculitis; Causes; Lesions; Prevention

Abbreviations

CIA: Chicken Infectious Anemia; CPNV: Chicken Proventricular Necrosis Virus; IBDV: Infectious Bursal Disease Virus; IBV: Infectious Bronchitis Virus; ND: Newcastle Disease; TP: Transmissible Proventriculitis; TVP: Transmissible Viral Proventriculitis

Introduction

Proventriculus

The proventriculus is the first part of bird's stomach, where digestive enzymes (hydrochloric acid and pepsinogen) are secreted and mixed with food before it goes to the gizzard. It is a rod shaped

glandular organ, located between the posterior esophagus and the gizzard, where food is stored and/or starts digestion.

Synonyms

Proventriculitis is a diseased condition that affects chickens suffering from diseases under names such as malabsorption syndrome, feed passage syndrome runting or stunting syndrome, and infectious or TP.

Economic importance of proventriculitis

Proventriculitis causes production losses in broiler chickens by decreased body weight gains, wide weight diversity of birds in the

flock and decrease feed conversion rate [1] and in broiler breeder and commercial layer hens [2]. Proventriculitis in broilers causes carcass condemnation when swollen proventriculus rupture, causing spillage of the proventricular contents into the body cavity during evisceration [3].

The disease has also been associated with impaired growth and poor feed conversion [4,5]. Microscopically, degeneration and necrosis of proventricular glands is observed, accompanied by marked intraglandular interstitial lymphocytic infiltration [6,7].

Causes of proventriculitis

Many agents have been implicated as potential causes of proventriculitis either alone or in combination. They may be infectious or Noninfectious causes (dietary agents). Noninfectious causes include oral exposure to biogenic amines [8], lack of dietary fiber [9], excessive copper sulfate [10,11] and mycotoxins [12], where feed contaminated by T-2 toxin, diacetoxyscirpenol or monoacetoxyscirpenol, all cause erosions in proventriculus. The amino acids lysine and histidine present in fish meal become gizzerosine due to excess heating during processing. The infectious include adenovirus [13], reovirus [14], IBDV [15,16], IBV [17], Marek's disease virus [18], CPNV [19], Clostridium species (*C. colinum*, *C. perfringens*, etc.) [4] and *Macrorhabdus ornithogaster* (megabacterium) [20].

Small hemorrhagic focus to major bleeding, on the proventriculus due to IBD virus, avian pox virus, avian influenza virus, ND virus and CIA virus. Under certain conditions such as immunosuppression or antibiotic abuse, the *Candida albicans* is able to colonize beak, crop and proventriculus.

In case of TVP, the experimental studied suggested etiological chicken CPNV as a causative agent of the disease, where isolate R11/3 (birnavirus) was isolated from TVP affected chickens [20].

Lesions of proventriculus

Lesions in the proventriculus have been reported in broilers suffering from diseases under names such as malabsorption syndrome, feed passage syndrome, runting or stunting syndrome, and infectious or TVP [21]. Infectious bursal disease virus (IBDV) has been associated with TP, although Pantin-Jackwood and Brown [15] examined chicken proventriculi and bursas for IBDV different

methods and concluded that naturally proventriculitis can occur in the absence of IBDV and tested strains do not directly produce proventriculitis or increased proventricular apoptosis. The role of IBDV in proventriculitis may be indirect as a result of its ability to cause immunosuppression in the chicken, so although under experimental conditions it didn't have a major effect on proventriculitis, it may explain why control of IBDV in the field seems to reduce the incidence of proventriculitis [4,22]. Proventriculi can be enlarged with mottled outer surface with gray-white plaques due to individual glands seen from the serosal surface, thickening of the mucosa and flattening of the proventricular glands [4,7,23].

Prevention

Because of the complexity nature of proventriculitis and interaction of the many causative factors, prevention may not be accomplished by a single vaccine or application of a single method [24]. It is important to prevent and control causes of proventriculitis to optimize productivity of broiler chickens. Good formulated ration free from mycotoxins must be given to chickens. Vaccination against infection causes especially those having immunosuppressive effect on infected birds with a proper vaccine in endemic farm with reovirus, IBDV, IBV and Marek's disease virus. Competitive exclusion with non-pathogenic bacteria has been shown to be effective against bacterial causes. Good hygiene, to avoid introduce and spread of microbial causes.

Conclusion

Proventriculitis can be considered as a threat for poultry production due to it causes losses due to low digestibility of ration and high condemnation rate in slaughterhouse. The condition can be produced with single or mixed bacterial infections. Difficulties in prevention due to multiple causes and sources of infection, and drug resistance in bacterial causes is a problem in drug use for control. Good hygiene to avoid causes immunosuppressive are needed to minimize losses due to proventriculitis in chickens.

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