Outbreak of chronic fowl cholera in broiler breeder in Korea

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Abstract

Fowl cholera is an infectious disease caused by *Pasteurella multocida*, affecting domesticated and wild birds. It usually appears as a septicemia of sudden onset with high morbidity and mortality, but chronic conditions that characterized by localized infections often occur. 13wks broiler breeders were submitted to the Kyung-pook national university for diagnosis. Clinical signs included approximately 1% mortality, severe lameness, ruffled feathers and swollen and/or cloudy eyes. At necropsy, the outstanding lesions were seen swollen hock joint, which were suppurative or caseous exudates, inflammation of conjunctiva, severe pneumonia and epicarditis. The causative agent was isolated from the hock joint, liver, sinus and sternum of the chickens, and performed physiological and biochemical test. To identify the serotype of *P. multocida*, capsular serotyping was conducted by multiplex polymerase chain reaction (PCR). In the antimicrobial susceptibility test, the isolates were resistance to the aminoglycosides. In this study, we confirmed chronic fowl cholera (FC) caused by *P. multocida* in broiler breeders in Korea

▶ **Key words** : Fowl cholera, chronic, broiler breeder, *Pasteurella multocida*, multiplex polymerase chain reaction, antimicrobial disc diffusion test

Introduction

Fowl cholera, caused by *Pasteurella multocida*, usually appears as a septicemic disease, but chronic conditions often occur. In chronic FC, signs and lesions are generally related to localized infections, wattles, joints, and footpads are often swollen because of accumulated suppurative exudates. In Korea an outbreak of FC was reported in sudden death of waterfowl, Baikal teals in Cheonsoo Bay (Kwon *et al.*, 2003). Also FC was occurrenced in broiler breeder farms, located in Peongtaek area of Gyeong-gi province and in Chung-cheong-nam Province(Woo *et al.*, 2006). We could confirm a chronic fowl cholera in chicken farm located in Peongtaek, Gyeong-gi province. The chickens were 13wks broiler breeder domesticated in floor system.

Materials and methods

1. Necropsy. The live or dead birds that submitted to our lab from broiler breeder farms were aseptically necropsied to find specific gross lesions, and were recorded.

2. Histopathology. Tissues or organs with specific lesions including eyes, hearts, livers, lungs, hock joints were fixed in 10% neutral buffered formalin, and processed for microscopic observation. All tissue samples were embedded in paraffin, sectioned at 5μm, and stained with hematoxylin and eosin (H&E).

3. Microbiological examination. For each chicken, the livers and hock joints were aseptically collected with sterile cotton-tipped swabs. Each swab was direct smeared on slide glass and processed Gram stain and Giemsa stain. Isolates were streaked on blood agar and MacConkey's agar. To identify of *P. multocida*, physiological and biochemical test was performed by motility test, fermentation of sugars, oxidase and catalase test, ornithine decarboxylase test and indole test.

4. Capsular serotyping by multiplex polymerase chain reaction. DNA of isolates was extracted from single colony grown on blood agar and used as the template in the amplification reactions. Primer sets and reaction conditions for multiplex PCR were conducted based on the Townsend method (Townsend *et al.*,2001).

5. Antimicrobial susceptibility test. For antimicrobial susceptibility test, a disc diffusion method was using 24 different antibiotics in accordance with the National Committee for Clinical Laboratory Standard.

Result

1. Clinical signs. Symptoms were severe lameness, swollen hock joints, ruffled feathers, swollen and/or cloudy eyes, and diarrhea.

2. Gross and histopathological findings. The swollen hock joints were filled with purulent or caseous exudate. Granulomas were scattered in parenchyma of lung. Granulomatous inflammation was presented between pericardium and epicardium.

3. Physiological and biochemical properties. Gram negative, bipolar-staining bacillus was observed through the microscope. The isolates were not grown on MacConkey agar and were found to be non-hemolytic on blood agar. And all isolates were positive for oxidase, catalase, indole test, no motility, fermentaion of dextrose, fructose, galactose, mannose, sucrose, trehalose, xylose, but did not fermentated of dulcitol, inositol, inulin, lactose, maltose, rhamnose.

4. Capsular serotyping. Multiplex PCR assay gave amplified products of ~460 and ~1044bp specific for *P. multocida* and capsular serogroup A.

5. Antimicrobial susceptibility test. The most of isolates were resistance to amikacin, gentamicin, kanamycin, tylosin, tiamulin, lincomycin.

Conclusion

We could confirm a chronic fowl cholera outbreak in broiler breeders submitted to our laboratory through the observations of clinical signs, gross and histopathological findings. The causative agent, *P. multocida*, was identified by microbiological examination. Also serotype of isolates was identified capsular serogroup A. The antimicrobial susceptibility of *P. multocida* isolates from chickens was resistance to aminoglycosides such as gentamicin and kanamycin. In further study, we are going to investigate somatic serotype and virulence of the *P. multocida*.

Reference

1. Kwon YK, Kang MI. 2003. Outbreak of Fowl cholera in Baikal teals in Korea. Avian Dis, 47(4):1491-5.
2. Woo YK, Kim JH. 2006. Fowl Cholera Outbreak in Domestic Poultry and Epidemiological Properties of *Pasteurella multocida* Isolate. The Journal of Microbiology, 44(3):344-53.
3. Townsend KM, Boyce JD, Chung JY, Frost AJ, Adler B. 2001. Genetic organization of *Pasteurella multocida* cap Loci and development of a multiplex capsular PCR typing system. J Clin Microbiol, 39(3):924-9.