THE SCIENCE WORLD
A Monthly e Magazine

ÍSSN: 2583-2212

August, 2022; 2(8), 1278-1281

Popular Article

Salmonellosis in Poultry

Sabita Behera, Subuhi Khan, Salauddin Qureshi
Division of Bacteriology and Mycology, Division of Biological Standardization,
Indian Veterinary Research Institute Izzatnagar UP 243122
https://doi.org/10.5281/zenodo.6973177

Abstract

Salmonellosis in birds is thought to be the most common bacterial disease affecting the poultry industry globally. It has a substantial impact on public health and is expensive in many nations. This subject requires a lot of time because of the economic and public health burden chronic diseases entail. This review article suggests that a more efficient implementation of currently available control measures would significantly lower the risks to the public's health.

Introduction

One of the most significant bacterial infections in chicken, Salmonella infection is brought on by a range of Salmonella species and results in huge economic losses through mortality and decreased productivity. One or more Salmonella species belonging to the family Enterobacteriaceae can cause acute or chronic salmonella infections in chicken. Additionally, zoonotic relevance is associated with motile Salmonellae (paratyphoid group) infection, which causes salmonellosis in hens.

Epidemiology of Avian Salmonellosis

Avian Salmonella infections are significant as a source of food-borne disease transmission to people as well as a cause of clinical disease in poultry. The genus Salmonella belongs to the Enterobacteriaceae family and is a facultative intracellular pathogen that can cause systemic or localized infections as well as a long-term asymptomatic carrier status. Salmonella enterica subsp. enterica serovar Gallinarum, which is separated into two distinct biovars under the serogroup D1 and is known as S. gallinarum and S. pullorum, respectively, is the causative agent of pullorum disease and poultry typhoid.

The salmonella serogroup D1 also includes S. enteritidis, S. panama, and S. dublin in addition to S. gallinarum-pullorum. Paratyphoid salmonellae are the many motile, non-host-adapted, highly invasive serotypes like Salmonella enteritidis and Salmonella typhimurium. Compared to brooding (14.55 percent), developing (16.10 percent), and pullet (16.10 percent) chickens, adult layers (53.25 percent) had the greatest infection rate for avian salmonellosis.

Various routes of infection

- Oral route
- nasal and cloacal route
- vertical transmission either from an infected ovary, oviduct or from the infected eggs
- contaminated feeds, water and litter

Risk factors responsible for *Salmonella* contamination of broiler-chicken flocks

- Inadequate level of hygiene
- Salmonella contamination of the previous flock with a persistence inside the house
- Contaminated day-old chicks and feed
- The farm structure (>3 houses on the farm)
- Wet and cold season
- Litter-beetle infestation of the house

Pathogenesis and Disease Syndrome of Avian Salmonellosis

Salmonella is invasive and has the capacity to live and grow in cells, particularly macrophages, which contributes to its pathogenicity. The digestive tract is where these bacteria multiply most frequently, which could lead to widespread environmental pollution from bacterial excretion through faeces. After entering the body through the intestinal mucosa, cecal tonsils, and Peyer's patches, the organisms are consumed by macrophages before spreading to the liver and spleen, which are the primary sites of multiplication, through the bloodstream and lymphatic systems. They may cause a second invasion and be localized in different organs, such as the ovaries, oviduct, heart, pericardium, gizzard, yolk sac, and/or lungs, in the event that the body's defense mechanisms are insufficient. In the avian challenge, S. typhimurium quickly inflamed the intestinal mucosa, but S. pullorum first targeted the Fabricius bursa before inducing inflammation

of the intestinal mucosa. While fowl typhoid exhibits symptoms of septicemic sickness, pullorum disease primarily develops as an intestinal disease of hens. Both septicemic biovars can result in acute or chronic infections, but unlike S. pullorum, S. gallinarum can also result in acute infections and hemolytic anaemia in both children and adults. Young broiler chicks are very pathogenic to S. gallinarum.

Unless the etiological agent is isolated and identified, pullorum illness and fowl typhoid cannot be distinguished from one another. Anorexia, diarrhoea, dehydration, weakness, and a high mortality rate are some of the clinical symptoms that affect chicks and poults. The symptoms of pullorum illness and chicken typhoid in mature fowls include anorexia, decreased egg production, increased mortality, decreased fertility, and decreased hatchability. Adult birds with S. pullorum infection may or may not show any clinical symptoms, and their physical characteristics may not allow for physical detection. Furthermore, it is still unclear how exactly these chicken diseases are contracted.

Diagnosis of Avian Salmonellosis

Salmonella strain isolation, identification, and serotyping should be done in order to validate the diagnosis of avian salmonellosis. Serologic testing, necropsy analysis, accompanied by microbiologic culture and typing for confirmation, can be used to detect infections in mature birds. A serological ELISA test has been developed to diagnose avian salmonellosis caused by S. typhimurium or S. enteritidis. Molecular test like PCR, RTPCR, PSR, LAMP have also been developed for diagnosis.

Preventive Measures for Controlling Avian Salmonellosis

Achieving successful control programmes requires establishing excellent management practices, routine serological tests, and a slaughter policy. Chicks should be free of diseases, and they should be kept in an environment that is clean, sanitized, and free of S. gallinarum and S. pullorum with stringent biosecurity measures. Salmonella should not be present in the feed or water. The dead birds must be disposed of properly. The disease may be controlled with vaccinations, and poultry typhoid and pullorum disease may be treated with antibiotics.

Public Health Concerns of Avian Salmonellosis

The majority of Salmonella strains are potentially dangerous to both humans and animals, which raises concerns about salmonellosis' impact on public health. People who are exposed to avian salmonellosis may experience health problems. Food poisoning symptoms, like diarrhea and acute gastroenteritis, are present. However, it appears that birds primarily pick up the illness from their surroundings, and diseased birds only play a minor part in the spread of the illness to domestic animals and people. Salmonella is the focus of various global, national, and local monitoring programmes because to public health concerns and the potential for foodborne zoonotic transmission.

References

Calnek, B.W.; Barnes, H.J.; Beard, C.W.; McDougald, L.R.; Saif, Y.M. Diseases of Poultry, 10th ed.; Iowa State University Press: Ames, IA, USA, 1997.

Haider, M.G.; Hossain, M.G.; Hossain, M.S.; Chowdhury, E.H.; Das, P.M.; Hossain, M.M. Isolation and characterization of enterobacteria associated with health and disease in sonali chickens. Bangl. J. Vet. Med. 2004, 2, 15-21.

Hofstad, M.S.; John, B.H.; Calnek, B.W.; Reid, W.N.; Yoder, H.W., Jr. Diseases of Poultry, 8th ed.; Panima Education Book Agency: New Delhi, India, 1992; pp. 65-123.

Otaki, Y. Poultry disease control programme in Japan. Asian Livestock 1995, 20, 65-67.

5. Wray, C.; Davies, R.H. Enterobacteriacae. In Poultry Diseases, 5th ed.; Jordan, F., Pattison, M., Alexander, D., Faragher, T., Eds.; W. B. Saunders: Philadelphia, PA, USA, 2001; pp. 95-130.

Wigley, P.; Berchieri, A., Jr.; Page, K.L.; Smith, A.L.; Barrow, P.A. Salmonella enterica serovar Pullorum persists in splenic macrophages and in the reproductive tract during persistent, disease free carriage in chickens. Infect. Immun. 2001, 69, 7873-7879.