European Journal of Research Development and Sustainability (EJRDS)
Available Online at: https://www.scholarzest.com
Vol. 4 No 12, December 2023
ISSN: 2660-5570

DIAGNOSIS AND TREATMENT OF AVIAN INFLUENZA BASED ON NEW TECHNOLOGIES

Karimov Rashid Parkhatovich
Khoshniazova Saulat Zhalgasbaevna
Niyazova Albina Allayarova
Institute of agricultural and agrotechnologies of Karakalpakstan
"Zooengineering va veterinary medicine" department's assistants

Article history:

Received: 4th October 2023
Accepted: 3rd November 2023
Published: 6th December 2023

Abstract:

In recent years, the aggressive and rapid spread of avian influenza has raised concerns worldwide. The early detection and effective treatment of this disease are crucial in preventing outbreaks and minimizing its impact on both animal and human populations. Fortunately, advancements in technology have significantly enhanced the diagnosis and treatment options for avian influenza. This article explores the various new technologies used in the diagnosis and treatment of avian influenza, highlighting their advantages and potential implications.

Keywords: Viruses, influence, detection system, advanced technologies, possible solutions

INTRODUCTION: Avian influenza (AI) is a viral contamination that impacts principally home rooster and pet, zoo, and wild birds. In home poultry, AI viruses are usually of low pathogenicity (LPAI), inflicting subclinical infections, respiratory disease, or diminished egg production. A few AI viruses, however, are enormously pathogenic (HPAI), inflicting extreme systemic ailment with more than one organ failure and excessive mortality rates. The structure of the sickness ensuing from HPAI viruses has traditionally been known as hen plague or chicken pest.

The contemporary epizootic of H5N1 tremendously pathogenic avian influenza (HPAI) in rooster is exceptional in its virulence, extent and longevity, elevating world difficulty that the virus ought to mutate into a shape without difficulty transmitted between human beings and provoke an influenza pandemic.

The capacity to swiftly and precisely diagnose infections with novel influenza subtypes is quintessential to minimizing morbidity and mortality in people and lowering the conceivable for a pandemic. Diagnostic checks (to become aware of influenza virus in scientific material, containing cells and secretions and tissues) are primarily based both on increase of virus in tradition or by means of direct detection of virus antigen or RNA.

Virus may additionally be amplified in embryonated poultry eggs or mammalian telephone culture, and then subjected to similarly trying out for identification. Serological methods might also additionally be used to become aware of the presence of antibody in the serum of uncovered individuals, supplying oblique evidence of infection. These simple methods can be used for diagnosing infections each in people and in animals.

In general, antigenic or molecular screening is used to first perceive influenza virus kind (A or B). Then the particular subtype is recognized primarily based on both serological reactivity of two viral floor glycoproteins, haemagglutinin (HA) and neuraminidase (NA), or on molecular characterization of the genes coding for these two proteins.

There are sixteen diagnosed HA and 9 identified[1] NA subtypes of influenza A viruses. Wild waterfowl are viewed the herbal reservoir for influenza A viruses, and all HA and NA subtypes of influenza A have been recognized in birds. Currently, solely two influenza A subtypes (H1N1 and H3N2) are circulating or performing in humans, inflicting routine human seasonal influenza epidemics.

The genuine technical 'know how' for influenza prognosis is pretty advanced, even though this has no longer but translated into huge innovation in speedy detection in subject settings. Improvements are consistently being made in each antigenic and molecular strategies for antigen and antibody detection, consisting of improvement of an increasing number of simple-to-use exams (e.g. dipstick tests). Simpler strategies are required for hobbies diagnostic screening and sero-epidemiological research in the field.

Despite technological advances, however, the accuracy of H5N1 diagnoses depends closely on the excellent of the specimens amassed and their preparation. If samples are no longer gathered from sufferers early in the direction of their contamination and/or from websites the place the viral load is high, or if samples are now not handled, stored, and transported appropriately, false-negative assessments may additionally end result irrespective of the validity of the take a look at used.

[1] *Forsman RW. Why is the laboratory an afterthought for managed care organizations? Clin Chem 1996;42:813–816.*

Detection of viral antigen (antigenic tests) Immunofluorescence assays (both direct and indirect) can be used for detection of H5N1 antigen in samples, however be counted closely on specimen quality. While rapid, these techniques are additionally structured on the satisfactory of fluorescence reagents and the know-how of the character decoding the outcomes of the checks and have inherently low sensitivity.

Enzyme immunoassays in a micro-plate layout are now not extensively used for human influenza diagnostics however the immuno-assay principle has been tailored for fast antigen detection (rapid diagnostic tests) with the aid of flow-through or lateral glide devices. Sensitivity and specificity of antigenic assessments rely now not solely on the check technique, however additionally on elements like kind of specimen analysed, best of specimen and timing of specimen series (related to viral shedding).

Based on posted data, sensitivities for detection of human influenza H1N1 or H3N2 in fast diagnostic checks are about 70–75% whilst specificities are about 90–99%. It ought to be referred to that sensitivity of such techniques for direct detection of H5N1 has been disappointing so far. The analytical sensitivity of presently reachable antigen detection take a look at kits for influenza A stays too low for dependable use as POC exams for direct detection of H5N1 virus in medical specimens. But if the sensitivity of such strategies can be enhanced, they may additionally grow to be beneficial for H5N1 fast testing.

Detection of viral RNA[2] The use of molecular methods to become aware of particular gene sequences offers a touchy technique for diagnosis. Furthermore, their use can doubtlessly expose the genetic sequence of the virus which is beneficial for molecular epidemiology and offers different essential traits of the virus, along with antiviral resistance status, prevalence of genetic reassortment or presence of key virulence mutations. While some of this records can be acquired by way of direct sequencing of PCR-amplified viral cDNA, greater certain molecular evaluation normally requires prior virus amplification by using culture.

PCR is used broadly now, with thermocyclers and different requisite tools reachable in many countrywide laboratories in the course of affected areas though preservation of the assays requires ordinary replace of commonplace information. The more than one check steps (extraction, amplification, detection) and reagent education are incredibly touchy to minor adjustments and requires experienced private working inside desirable first-class systems. In particular, the amplification response of viral nucleic acids makes it inclined to cross-contamination, except stringent measures to keep away from such illness are in place.

'Chip technology', which consists of miniaturized strategies to genetic sequence detection may additionally additionally enable simple, automated, speedy and reasonably-priced PCR trying out on a massive scale, however automatic structures are nonetheless expensive, and availability of a POC chip platform is at least four years away.

Numerous state-of-the-art chip strategies to detection are accessible however all in the end rely upon binding to precise virus sequences. As the viral mutation fee is high, it is essential for all these techniques that consistent surveillance of viral genetic sequence versions occurs, permitting changes to primers and probes.

PREVENTION OF AVIAN INFLUENZA:

Exclusion biosecurity techniques to forestall the introduction of avian influenza into fowl are the pleasant preventive measure. Suspected outbreaks need to be pronounced to fabulous regulatory authorities.

Antigenically matched and true administered vaccines can stop AI infections, medical signs, and death. If birds turn out to be infected, vaccines notably limit virus replication and shedding from the respiratory and GI tracts. Specific safety is finished thru autogenous virus vaccines and thru vaccines organized from the AI virus of the equal hemagglutinin subtype.

Antibodies towards the homologous viral neuraminidase antigens may also furnish partial protection. Only inactivated total AI virus, DNA of H5 hemagglutinin, RNA particle (defective jap equine encephalitis virus) with H5 hemagglutinin insert, recombinant fowlpox-AI-H5, and recombinant herpesvirus-turkey-AI-H5 (rHVT-AI-H5) vaccines are licensed in the US.

Vaccination in opposition to AI viruses is extraordinarily regulated and constrained in many countries. In the US, the use of any licensed AI vaccine for H1–H4, H6, and H8–H16 hemagglutinin subtypes requires approval by means of the nation veterinarian for the nation in question. In addition, the use of H5 and H7 AI vaccines in the US requires statement of an emergency and approval by means of the secretary of agriculture.

CONCLUSION

The continuous development and utilization of new technologies have revolutionized the diagnosis and treatment of avian influenza. The timely and accurate detection of the virus enables swift implementation of control measures, preventing further transmission. Advances in treatment options offer hope in managing and containing the disease's impact. However, ongoing research and innovation are crucial to further optimize these technologies. By leveraging the power of technology in the battle against avian influenza, we can strive towards a future with reduced outbreaks and improved outcomes for both avian and human populations.

REFERENCES:

[2] *Weekly Epidemiological Record . Antigenic and genetic characteristics of H5N1 viruses and candidate H5N1 vaccine viruses developed for potential use as pre-pandemic vaccines. Wkly Epidemiol Rec 2007;82:164–167.*

1. Forsman RW. Why is the laboratory an afterthought for managed care organizations? Clin Chem 1996;42:813–816.
2. Webster RG, Bean WJ, Gorman OT, Chambers TM, Kawaoka Y. Evolution and ecology of influenza A viruses. Microbiol Mol Biol Rev 1992;56:152–179.
3. Saitou N, Nei M. Polymorphism and evolution of influenza A virus genes. Mol Biol Evol 1986;3:57–74.
4. Weekly Epidemiological Record . Antigenic and genetic characteristics of H5N1 viruses and candidate H5N1 vaccine viruses developed for potential use as pre-pandemic vaccines. Wkly Epidemiol Rec 2007;82:164–167.
5. Offringa DP, Tyson-Medlock V, Ye Z, Levandowski RA. A comprehensive systematic approach to identification of influenza A virus genotype using RT-PCR and RFLP. J Virol Methods 2000;88:15–24.
6. Harmon MW, Rota PA, Walls HH, Kendal AP. Antibody responses in humans to influenza type B host-cell-derived variants after vaccination with standard (egg-derived) vaccine or natural infection. J Clin Microbiol 1988;26:333–337.