

Relationship between Newcastle virus interference phenomenon and treatment of covid-19 disease

Masoud Moghaddam Pour¹

¹Zist Fanavaran Pajoh Alborz

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Abstract

I was infected with the Covid-19 virus .On the seventh day after sickness , 0.1 ml (log 10⁸ /ml) of live Newcastle (strain I 2) vaccine was inoculated through nasal drops .After about 12 hours, unbelievably all the symptoms of Covid-19 were disappeared .

Case report :

Relationship between Newcastle virus interference phenomenon and treatment of covid-19 disease

^{1,2} *Masoud Moghaddam Pour 1 R&D department , Razi Vaccine and Serum Research Institute (Hesarak), Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran

2 R&D department , Zist Fanavaran Pajoh Alborz co.

*Masoud Moghaddam Pour (*mmoghaddamp@yahoo.com* & *m.moghaddam@rvri.ac.ir*)

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or COVID-2019) spread in Wuhan city of Hubei province in China is family of Corona viruses (CoVs) that cause respiratory and intestinal illnesses in humans and animals (poultry infectious bronchitis disease (IBD)) . They usually cause mild colds in human .The outbreaks of severe acute respiratory syndrome (SARS) 2002–2003 in China and Middle East Respiratory Syndrome (MERS) in the Arabian Peninsula in 2012 showed that corona viruses can also cause severe disease.(9)

Outbreak of novel coronavirus infectious disease was happened in December 2019. Until now , no treatments or drugs have been reported for COVID-19 infection. There is currently no vaccine or specific antiviral drug available for the infection of the COVID-19 virus. It is very important to find a safe and effective therapeutic agent for patients infected with the COVID-19 virus.(16,33,34)

Newcastle Disease (ND) and Poultry Infectious Bronchitis(IB) are two diseases that cause irreparable damage in industrial and domestic poultry flocks. These two diseases are prevented by effective live & inactivated vaccines.

The causative agent of Newcastle disease (ND) is a single-stranded negative-sense RNA virus belonging to avian paramyxovirus type 1 (APMV-1) of the family Paramyxovirida and subgenus Avulavirus . NDV can be divided into three groups according to their virulence in poultry: velogenic, mesogenic, and lentogenic . (10) ND vaccines are mainly prepared from strains of the lentogenic group (like I2 strain) which one of the most important advantages is grown to a high titer in embryonated eggs, and they can be administered

via the nasal route .(23) Vaccinologists has interested in NDV (APMV-1) which has simple RNA genome, efficient replication, host restriction, and non pathogenicity in most mammals for its oncolytic activity and its use as animal and human vaccines vector against lethal emerging human diseases recently.(3,5,8,10,12,14)

In addition NDV has no similar pathogenicity in humanity and it has been shown in prior studies that NDV does not pose a threat to human health, and the majority of the human population does not have pre-existing immunity.(3,18,20)

IBV, the chicken coronavirus , is one of the important causes of economic loss within the poultry industry. The IB virus like COVID-19 virus replicates in epithelium of respiratory tract tissue.(7)

The phenomenon of viral interference between ND and IB in live vaccines has been reported since the 50's and in many articles have be reported its prejudicial effects on avian immunization. (6,13,26,30,32)

Viral interference take place when two viruses infect a single cell and one of them put a problem with the growth or replication of the other virus. (19,29) Interference of IB virus with ND has been established in poultry ,(15) embryonated chicken eggs (27) and chicken embryo kidney cells .(2)

Currently, there are different opinions about the antiviral function of ND virus interferon, but if they do not consider it to be the only factor, they consider it to be an effective antiviral action in interference.(4,22,29)

Cardoso WM et al. proved that if a bivalent vaccine (IB-ND) is used instead of inoculating Newcastle and Infectious Bronchitis that were combined just before vaccination, the interference between the two viruses would be reduced.(6)

Moghaddam Pour et al. in the development research bivalent IB/ND vaccine of RAZI , the interference between viruses was reduced by using different ratios of viruses. In that research, chickens were inoculated with bivalent live vaccines with different titers of ND virus and IB virus. No antibody against infectious bronchitis was observed in the group of chickens inoculated with the bivalent live vaccine that contained more ND virus than IB virus. That is, with the superiority of ND virus particles over IB virus, no antibodies against IB virus were secreted in the bird and vice versa. In previous researches, it has been reported that the interference is observed in the superiority of IB to ND virus, but the phenomenon of interference can also happen with the superiority of ND to IB, and in this case, the lack of growth of IB virus can be predicted. (24)

Results :

The first person who volunteered to be treated with Newcastle virus was a 55-year-old man who was infected with the Covid-19 virus, which started with a slight swelling in the throat and a low-grade fever in the first days of the illness.

But after 5 days, the disease progressed and high fever with lethargy, severe muscle pain, sweating, headache and excessive sweating were evident.

High fever (more than 39)and severe muscle pain could not be treated even with sedatives and antipyretic drugs.

On the seventh day after sickness , 0.1 ml ($\log 10^8$ /ml) of live Newcastle (strain I 2) vaccine was inoculated to the patient through nasal drops. After about 12 hours, unbelievably all the symptoms of Covid-19, including lethargy, fever, muscle pain, sweating, and heavy headache were disappeared. But the cough and throat discharge were continued for about 20 days. 27 days after the onset of the disease, the patient's sera was sent to the Razi Institute's Covid-19 Research Laboratory for hemagglutination inhibition (HI) assay for antibody of Newcastle virus and Virus neutralization (VN) assay (antibody blood assay) for Covid-19 testing. The result of HI was 4 based on the log 2 and 700 VN50 for Covid-19 test .

Conclusion:

ND virus I2 strain that was used in this experiment is heat resistant and among other lentogenic strains, it grows the most in chicken embryos.

People may infected with ND but causes conjunctivitis only.(23) Laboratory workers and vaccinator crews are the major ones who may be infected with ND but there are no known reports of transmission to humans via poultry such as transmission from meat processing or meat consumption, etc. On this basis it can be concluded that Newcastle should not pose any potential risk to human health.(1,26)

Before using ND for the treatment of Covid-19, several possible events imagined after ND inoculation.

1-Interference of Newcastle virus with Covid-19 would not be carried out and so nothing would happen .

2- Other possibility was that with the presence of Covid-19 disease , the patient would get a new disease .

3-Interference of ND with Covid-19 would be done like co-infection with IBV.

The third possibility happened. The phenomenon of interference between ND and Covid-19 virus was created and the patient recovered quickly.

It is not possible to determine the real cause or causes the phenomenon, but based on the articles of co-infection ND and IB in birds, some facts can be stated.

- As mentioned, ND did not worsen the pathological condition of the covid-19 patient and even no new disease symptoms were observed.(3)

- Covid-19 and ND viruses enter the cells through different receptors , so can be imagined both of them penetrate in one cell .

-ND virus particles, which is more than 10^{-8} /ml , could take over the cell's genome production factory and interfered with replication of covid-19 virus. (17)

- The increasing interferon due to the multiplication of the ND virus. (21)

It has been said in co-infection ND and Avian influenza virus(AI) , the results in different birds are not the same, and in turkeys did not affect the replication of any of the them.(25,31) So the treatment of Covid-19 with ND may have different effects in different populations and maybe it is ineffective in some people in countries.

If in co-infection of avian influenza with ND, infection with one virus can interfere with the replication of the other virus and modify the pathogenesis and transmission of the viruses (25), is treatment human flu disease with ND conceivable ?

The interference between viruses has already been important for researchers since the 50s. It seems this issue will be more important now when more emerging diseases have appeared.It means in zoonosis diseases , which pathogenic agents which may move to different species ,biological researchers instead of waiting for viral diseases to emerge in populations , they should identify useful viruses , and use them when needed .(11)

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