ARTICLE INFO

Article History:
Received 13th December, 2019
Received in revised form 11th January, 2020
Accepted 8th February, 2020
Published online 28th March, 2020

Key Words:
Despite the progress made in immunization and drug development, many viruses lack preventive vaccines and efficient antiviral therapies, which are often beset by the generation of viral escape mutants.

INTRODUCTION

Corona viruses are found in avian and mammalian species. They resemble each other in morphology and chemical structure: for example, the corona viruses of humans and cattle are antigenically related. There is no evidence, however, that human corona viruses can be transmitted by animals. In animals, various corona viruses invade many different tissues and cause a variety of diseases, but in humans they are only proved to cause mild upper respiratory infections, i.e. common colds.

Corona virus disease (COVID-19) is a new strain that was discovered in 2019 and has not been previously identified in humans.

Corona viruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that severe acute respiratory syndrome (SARS-CoV) was transmitted from civet cats to humans and Middle East respiratory syndrome (MERS-CoV) from dromedary camels to humans. Several known corona viruses are circulating in animals that have not yet infected humans. The virus is now called severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) and the disease it causes is called COVID-19.
Host Defenses
The appearance of antibody in serum and nasal secretions is followed by resolution of the infection. Immunity wanes within a year or two.

Epidemiology
Incidence peaks in the winter, taking the form of local epidemics lasting a few weeks or months. The same serotype may return to an area after several years.

Human Corona virus Types
Corona viruses are named for the crown-like spikes on their surface. There are four main sub-groupings of corona viruses, known as alpha, beta, gamma, and delta.

Human corona viruses were first identified in the mid-1960s. The seven corona viruses that can infect people are following:

Common human corona viruses
1. 229E (alpha corona virus)
2. NL63 (alpha corona virus)
3. OC43 (beta corona virus)
4. HKU1 (beta corona virus)

Other human corona viruses
5. MERS-CoV (the beta corona virus that causes Middle East Respiratory Syndrome, or MERS)
6. SARS-CoV (the beta corona virus that causes severe acute respiratory syndrome, or SARS)
7. SARS-CoV-2 (the novel corona virus that causes corona virus disease 2019, or COVID-19)

People around the world commonly get infected with human corona viruses 229E, NL63, OC43, and HKU1.

Sometimes corona viruses that infect animals can evolve and make people sick and become a new human corona virus. Three recent examples of this are 2019-nCoV, SARS-CoV, and MERS-CoV.

Diagnosis
There is no reliable clinical method to distinguish corona virus colds from colds caused by rhinoviruses or less common agents. For research purposes, virus can be cultured from nasal swabs or washings by inoculating organ cultures of human fetal or nasal tracheal epithelium. The virus in these cultures is detected by electron microscopy or other methods. The most useful method for laboratory diagnosis is to collect paired sera (from the acute and convalescent phases of the disease) and to test by ELISA for a rise in antibodies against OC43 and 229E. Complement fixation tests are insensitive; other tests are inconvenient and can be used only for one serotype. Direct hybridization and polymerase chain reaction tests for viral nucleic acid have been developed and, particularly with the latter, are the most sensitive assays currently available for detecting virus. Laboratory diagnosis may be made on the basis of antibody titers in paired sera. The virus is difficult to isolate. Nucleic acid hybridization tests (including PCR) are now being introduced.

In general, these lab tests fall into two categories

- Molecular tests, which look for evidence of active infection.
- Serology tests, which look for previous infection by detecting antibodies to MERS-CoV. Serology tests are for surveillance or investigational purposes and not for diagnostic purposes.

Molecular Tests
Molecular tests are used to diagnose active infection (presence of MERS-CoV) in people who are thought to be infected with MERS-CoV based on their clinical symptoms and having links to places where MERS has been reported.

Real-time reverse-transcription polymerase chain reaction (rRT-PCR) assays are molecular tests that can be used to detect viral RNA in clinical samples. CDC’s current case definition for laboratory confirmation of MERS-CoV infection requires either a positive rRT-PCR result for at least two specific genomic targets, or a single positive target with sequencing of a second target.

Most state laboratories in the United States are approved to test for MERS-CoV by using an rRT-PCR assay developed by CDC. This test is done under authority of an Emergency Use Authorization because there are no FDA-cleared/approved tests available for this purpose in the United States.

The success of rRT-PCR testing depends on several factors, including the experience and expertise of laboratory personnel, laboratory environment (e.g., avoidance of contamination), and the type and condition of specimens being tested. For this rRT-PCR assay, CDC recommends collecting multiple specimens, including lower (bronchialveolar lavage, sputum and tracheal aspirates) and upper (e.g., nasopharyngeal and or pharyngeal swabs) respiratory samples, serum, and stool specimens.

CDC considers a person under investigation to be negative for active MERS-CoV infection following one negative rRT-PCR test on the recommended specimens. Since a single negative result does not completely rule out MERS-CoV infection, in some circumstances additional specimens may be tested.

CDC considers a known MERS patient to be negative for active MERS-CoV infection following two consecutive negative rRT-PCR tests on all specimens.

Serology Tests
Serology testing is used to detect previous infection (antibodies to MERS-CoV) in people who may have been exposed to the virus. Antibodies are proteins produced by the body’s immune system to attack and kill viruses, bacteria, and other microbes during infection. The presence of antibodies to MERS-CoV indicates that a person had been previously infected with the virus and developed an immune response.

Evidence to date suggests there may be a broader range of MERS disease than was initially thought. For example, public health investigators have identified individuals who are PCR-positive but have no MERS symptoms; we do not know if MERS-CoV can be spread by these people. For this reason, public health scientists are working to learn more about how the virus is transmitted. One way to do this is through
Signs and symptoms
Corona virus affects both animals and human beings. It displays wide range of symptoms of respiratory to nervous system like common cold, pneumonia, and giddiness. It affects the respiratory system and makes it fail. In severe cases vital organs like heart, liver & brain functions could be affected.

- It takes two to fourteen days for symptoms to appear after one is affected by Corona virus. So what are typical signs and symptoms?
- **Respiratory system**- Sore Throat, Cough, Headache, Breathlessness, Tiredness, Running Nose. Critical cases been detected as respiratory failure, septic shock, and/or multiple organ dysfunction/failure.
- **Digestive system** - Vomiting Diarrhoea with Abdomen Pain.
- **Muscular system** - Fatigue, body ache.
- **Lymphatic or Immune system** - Fever.
- **Nervous system** – Corona virus causes demyelination in central nervous system & impaired coordination of brain & body.
- Mild cases may resemble the flu or a bad cold.

The main symptoms of the corona virus usually include

- Runny nose
- Sore throat
- Dry cough
- Fever
- Tiredness
- Difficulty breathing (severe cases)

Some patients may have "aches and pains, nasal congestion, runny nose, sore throat or diarrheaa", the WHO adds. "These symptoms are usually mild and begin gradually. Some people become infected but don’t develop any symptoms and don't feel unwell".

These symptoms are similar to other respiratory diseases including flu and the common cold. So if you have symptoms, consider the following:

How quickly do symptoms emerge?
Symptoms are thought to appear between 2 to 10 days after contracting the virus, but it may be up to 24 days.

Most people (about 80 per cent) recover from the disease without needing special treatment. However, around one out of every six people (16 per cent) becomes seriously ill and develops difficulty breathing.

Older people, and those with underlying medical problems like high blood pressure, heart problems, lung complaints or diabetes, are more likely to develop serious illness.

Causes
It's unclear exactly how contagious the new corona virus is. It appears to be spreading from person to person among those in close contact. It may be spread by respiratory droplets released when someone with the virus coughs or sneezes.
Precautions for avoiding respiratory viruses:

Although there is no vaccine available to prevent infection with the new corona virus, you can take steps to reduce your risk of infection. WHO and CDC recommend following the standard precautions for avoiding respiratory viruses:

- Wash your hands often with soap and water, or use an alcohol-based hand sanitizer.
- Cover your mouth and nose with your elbow or tissue when you cough or sneeze.
- Avoid touching your eyes, nose and mouth if your hands aren't clean.
- Avoid close contact with anyone who is sick.
- Avoid sharing dishes, glasses, bedding and other household items if you're sick.
- Clean and disinfect surfaces you often touch.
- Stay home from work, school and public areas if you're sick.
- Only wear a mask if a health care provider tells you to do so.
- Avoid eating raw or undercooked meat or animal organs.
- Avoid contact with live animals and surfaces they may have touched if you're visiting live markets in areas that have recently had new coronavirus cases.
- Maintain enough distance (six feet or more) between yourself and anyone outside your family.
- Remove the virus from your home as much as possible to further reduce your risk of being exposed.
- Clean and disinfect high-touch surfaces in your home, such as counters, tabletops, doorknobs, bathroom fixtures, toilets, phones, keyboards, tablets, and bedside tables, every day.
- If you are 60 or over and have an underlying health condition such as cardiovascular disease, diabetes or respiratory illnesses like asthma or COPD, the World Health Organization advises you to try to avoid crowds or places where you might interact with people who are sick.
- It is important to wash all fruit and vegetables before you eat them to ensure they are clean and safe to eat.

Transmission of new corona virus

Experts believe that an infected animal may have first transmitted the virus to humans at a market that sold live fish, animals and birds in Wuhan. The market was later shut down and disinfected, making it nearly impossible to investigate which animal may have been the exact origin.

Bats are considered a possible source, because they have evolved to coexist with many viruses, and they were found to be the starting point for SARS. It is also possible that bats transmitted the virus to an intermediate animal, such as pangolins, which are consumed as a delicacy in parts of China, and may have then passed on the virus to humans.

People infected with the virus produce tiny respiratory droplets when they breathe, talk, cough or sneeze, allowing the virus to travel through the air.

Most respiratory droplets fall to the ground within a few feet. People, who are in close contact with those infected, particularly family members and health care workers, may catch the virus this way.

Scientists don’t know how long the new corona virus can live on surfaces, and preliminary research suggests that hot and humid environments may not slow down the pathogen’s spread. Warm weather does tend to inhibit influenza and milder corona viruses.

Infected people may be able to pass on the new corona virus even if they have few obvious symptoms.

Prevention

Practice every day

As you touch people, surfaces and objects throughout the day, you accumulate germs on your hands. You can infect yourself with these germs by touching your eyes, nose or mouth.

To protect yourself, wash your hands often with soap and water for at least 20 seconds. If soap and water aren’t available, use an alcohol-based hand sanitizer with at least 60% alcohol.

Although there is no vaccine available to prevent infection with the new corona virus, you can take steps to reduce your risk of infection. WHO and CDC recommend following the standard precautions for avoiding respiratory viruses:

- Wash your hands often with soap and water, or use an alcohol-based hand sanitizer.
- Cover your mouth and nose with your elbow or tissue when you cough or sneeze.
- Avoid touching your eyes, nose and mouth if your hands aren't clean.
- Avoid close contact with anyone who is sick.

Risk factors

Risk factors for COVID-19 appear to include:

- Recent travel from or residence in an area with ongoing spread of COVID-19 as determined by CDC or WHO.
- Close contact with someone who has COVID-19 — such as when a family member or health care worker takes care of an infected person.

Travel

If you're planning to travel internationally, first check the CDC and WHO websites for updates and advice. Also look for any health advisories that may be in place where you plan to travel. You may also want to talk with your doctor if you have health conditions that make you more susceptible to respiratory infections and complications.

What is being done to find an effective treatment?

Vaccines and treatment options for COVID-19 are currently being investigated around the world. There’s some evidence that certain medications may have the potential to be effective with regard to preventing illness or treating the symptoms of COVID-19.

However, researchers need to perform randomized controlled trials Trusted Source in humans before potential vaccines and other treatments become available. This may take several months or longer.

Here are some treatment options that are currently being investigated for protection against SARS-CoV-2 and treatment of COVID-19 symptoms.

Remdesivir

Remdesivir is an experimental broad-spectrum antiviral drug originally designed to target Ebola.

Researchers have found that remdesivir is highly effective at fighting the novel coronavirus in isolated cellsTrusted Source. This treatment is not yet approved in humans, but two clinical trials for this drug have been implemented in China.
clinical trial was recently also approved by the FDA in the United States.

**Chloroquine**

Chloroquine is a drug that’s used to fight malaria and autoimmune diseases. It’s been in use for more than 70 years. Trusted Source and is considered safe.

Researchers have discovered that this drug is effective at fighting the SARS-CoV-2 virus in studies done in test tubes. At least 10 clinical trials Trusted Source are currently looking at the potential use of chloroquine as an option for combating the novel coronavirus.

**Lopinavir and ritonavir**

Lopinavir and ritonavir are sold under the name Kaletra and are designed to treat HIV.

In South Korea, a 54-year-old man was given a combination of these two drugs and had a significant reduction in his levels of the corona virus.

According to the World Health Organization (WHO), there could be benefits to using Kaletra in combination with other drugs.

**APN01**

A clinical trial is set to start soon in China to examine the potential of a drug called APN01 to fight the novel coronavirus. The scientists who first developed APN01 in the early 2000s discovered that a certain protein called ACE2 is involved in SARS infections. This protein also helped protect the lungs from injury due to respiratory distress.

From recent research, it turns out that the 2019 corona virus, like SARS, also uses the ACE2 protein to infect cells in humans.

The randomized, dual-arm trial will look at the effect of the medication on 24 patients for 1 week. Half of the participants in the trial will receive the APN01 drug, and the other half will be given a placebo. If results are encouraging, larger clinical trials will be done.

**Favilavir**

China has approved the use of the antiviral drug favilavir to treat symptoms of COVID-19. The drug was initially developed to treat inflammation in the nose and throat.

**Control**

Although antiviral therapy has been attempted, the treatment of corona virus colds remains symptomatic. The likelihood of transmission can be reduced by practising hygienic measures. Vaccines are not currently available. Treatment of common colds is symptomatic; no vaccines or specific drugs are available. Hygiene measures reduce the rate of transmission.

Herbal medicines and purified natural products provide a rich resource for novel antiviral drug development. Identification of the antiviral mechanisms from these natural agents has shed light on where they interact with the viral life cycle, such as viral entry, replication, assembly, and release, as well as on the targeting of virus–host-specific interactions.

As many viruses remain without preventive vaccines and effective antiviral treatments, eradicating these viral diseases appears difficult. Nonetheless, natural products serve as an excellent source of biodiversity for discovering novel antivirals, revealing new structure–activity relationships, and developing effective protective/therapeutic strategies against viral infections.

**Yoga & Herbal Remedies for prevention**

Corona virus will not be affected by regular practice of Bhastrika, Kapalabhati, Anulom-Vilom Pranayama and making a decoction of turmeric, black pepper, giloy, ginger and basil.

Indian gooseberry juice 50ml, ginger 10ml, fresh lime juice 5ml, turmeric powder 1/4 tsp, drinking water 200ml - mix all ingredients.

**Adult:** 250ml twice a day.

**Children:** 100ml twice a day.

Peeled crushed ginger 10gm, freshly crushed black pepper 1/4 tsp, crushed adhamiduram 5gms (liquorice root – mulethi ki jad), turmeric powder 1/4 tsp, and drinking water 250ml - mix all ingredients.

**Adult:** 250ml twice a day.

**Children:** 100ml twice a day.

Eating a tablespoon of Chywanprash daily enhances immunity and it may help prevent the spread of the virus, according to Ayurveda experts.

Nasya’, a therapeutic treatment for the nose, throat, sinuses and head, can be done with medicated oils like anu oil and shadabindu oil.

Consuming 'kadha' ( decoction) of giloy and tulasi with black pepper, turmeric and ginger will boost immunity

- Mix Tulsi ark in your drinking items Like (Tea, Coffee, Water, Milk)
- Tulsi and Giloy Ark, Drink It Early in the Morning on an Empty Stomach.

**Preventive measures in Ayurveda**

According to Ayurveda, Corona virus disturbs equilibrium of Vata and Kapha dosha. Hence, it recommends Pitta vardhak (stimulating pitta until it balances Kapha & Vata dosha) diet and lifestyle. Food changes, as suggested below, can help to restore these functions back in the body.

a. Eat vegetables like Fenugreek. It absorbs abnormal kapha.

b. Add Spices in food for e.g. garlic, ginger, turmeric to stimulate taste & assimilation

c. Drink turmeric powder and milk.

d. Eat fruits like papaya oranges and lemons.

e. Avoid cold drinks, ice-creams and cold food.

Rasayana herbs like Aswagandha, Giloya kwath, Dashmul kwath improves internal immunity.

**References**


How to cite this article:
DOI: http://dx.doi.org/10.24327/ijrsr.2020.1103.5157

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