

27 SARS CoV and other coronaviruses

The viruses

Coronaviruses (CoV), including SARS CoV, are single-stranded RNA viruses and belong to the family Coronaviridae.

Epidemiology

Route of spread

Coronaviruses are spread by the respiratory route.

Severe acute respiratory syndrome (SARS) is caused by SARS coronavirus (SARS CoV), which is spread by the respiratory route and through the ingestion of aerosolized faeces via contamination of the hands and environment. Close contact with a symptomatic person poses the highest risk of infection. In the 2003 outbreak, most cases occurred in hospital workers or family members in contact with cases.

Prevalence

Coronaviruses have a worldwide distribution and almost all adults in the UK have been infected by at least one type of coronavirus. Infection usually occurs in winter or spring and is associated with upper respiratory tract infection (a 'cold'). The severity of illness is similar to that of rhinovirus infection, but less severe than infection with respiratory syncytial virus or influenza viruses. Symptoms are usually more severe in elderly persons. Reinfection is common.

SARS CoV caused a worldwide outbreak between March and July 2003, and there was a smaller outbreak, probably associated with laboratory-released SARS CoV, in 2004. There were over 8000 cases reported from 32 countries. There have been no more cases since then. The outbreak originated in Guandong Province in China and is thought to have been transmitted from civet cats (a variety of wild cat) to humans with subsequent human-to-human spread.

Incubation period

2–4 days (SARS has an incubation period of 2–7 days).

Infectious period

Coronaviruses are considered infectious while patients are symptomatic. Patients are most infectious at the onset of respiratory symptoms.

At-risk groups

Coronavirus infection is more severe in elderly persons. The most severe and fatal infections with SARS have been in elderly persons.

Clinical

Symptoms

Coronaviruses produce a range of symptoms from asymptomatic infection to upper respiratory symptoms (a 'cold'), malaise and fever. Bronchiolitis and other lower respiratory tract symptoms occur in a few patients of all ages.

Coronaviruses can be found in the human gut, but there is no clear disease association.

SARS CoV causes high fever ($>38^{\circ}\text{C}$), dry cough, shortness of breath, myalgia, headache and diarrhoea. Chest X-rays show pneumonia or respiratory distress syndrome. Symptoms are usually severe enough to warrant hospital admission. The overall fatality rate was 15% in previous outbreaks, higher in elderly patients and those with other respiratory conditions; less than 1% in persons less than 24 years of age, 6% in those aged 25–44 years, 15% in those aged 45–64 years and greater than 50% in persons aged 65 years or older.

Differential diagnosis

Parainfluenza, RSV, adenovirus and other respiratory viral infections have to be considered in the differential diagnosis of respiratory CoV infections.

SARS CoV infection has to be distinguished from influenza and other causes of pneumonia and high fever.

Laboratory diagnosis

Coronaviruses are not usually tested for in most hospital laboratories, although some regional virology laboratories may include coronavirus detection in their respiratory PCR diagnostic test repertoire. They are difficult to grow in cell culture.

SARS CoV is only diagnosed in specialist reference laboratories with Category 4 diagnostic facilities. In England there are two centres of the Health Protection Agency, in London and Porton Down, that are able to undertake this work. Infection can be diagnosed by PCR or serological tests.

Management

Treatment

There is no specific treatment for coronavirus infections, including SARS CoV. Management of the latter requires supportive management of the presenting symptoms.

Infection control

The spread of coronaviruses can be reduced by strict handwashing after patient contact. The use of gloves, face masks, aprons and goggles will reduce the risk of transmission. Isolation in single rooms or cohort nursing reduces the risk to other patients.

Severe acute respiratory syndrome is less infectious than influenza but symptomatic patients should be nursed in side rooms, preferably negative-pressure rooms, with gloves, aprons and a respirator mask conforming to at least European standard EN149:2001 FFP3. If a suitable respirator mask is not immediately available, use a surgical face mask (see latest guidance).

Useful website

Refer to www.hpa.org.uk for more information on diagnosis and infection control for SARS CoV.