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EDITORIAL COMMENT

Severe acute respiratory syndrome (SARS): A new emerging disease in the 21st century

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Every so often a new infection emerges to cause disease in human beings. Respiratory infections are the leading cause of human mortality and accounted for 3-9 million deaths in 2001. Severe acute respiratory syndrome (SARS) is the first severe and readily transmissible new disease to emerge in the 21st century.

Early on in the SARS outbreak there was reason for major concern when it was thought that the disease could be an unusually virulent and fatal form of pneumonia. The rapid worldwide spread of the coronavirus that causes SARS and the fact that by May 5th 2003, 28 countries reported cases of this infectious disease, suggested that as for other infectious diseases, evolution and spread is facilitated by the mobility of the society either through air travel or the densely populated urban areas especially in Asia.

Despite the fact that the virus seemed to travel around the world "at the speed of a jumbo jet", to date the number of cases is still not so high. However, SARS seems to continue abating in most places and by May 20, 7956 cases of SARS and 666 deaths were reported worldwide since the start of the epidemic. Furthermore, by May 31st, WHO issued recommendations pertaining to international travel such as exit screening for international travelers departing the areas of Canada and Asia Pacific region, including mainland China and travelers postponing all travel to these areas except Hong-Kong.

The first cases of SARS have emerged in mid-November 2002 in Guangdong, China and the first official report of 305 cases from the area were reported by WHO on February 11th 2003, 30% of these cases occurring in health care workers.

SARS need to be regarded as a particularly serious threat for several reasons[1]:

a. the disease has no vaccine and no treatment
b. the virus comes from a family notorious for its frequent mutations making the prospects for vaccine development questionable
c. all available diagnostic tests have limitations
d. epidemiology and pathogenesis of the disease are poorly understood
e. the disease concentrates in hospital staff: the human resource vital to control
f. a significant proportion of patients requires intensive care
g. the incubation period of 10 days allows spread via air travel between any two cities in the world

The mean incubation period of the disease is estimated to be 4-6 days, and the time from onset of clinical symptoms to admission to hospital between 3-5 days.

The estimated fatality rate is reported to be 13.2 % for patients <60 years old, rising to 43.3% for patients > 60 years old, suggesting that age is strongly associated with the outcome of the disease, whereas early admission to hospital seems not to alter outcome.

However, interval between infection and onset of symptoms or onset and hospital admission, the degree of the infectiousness of the agent and the extent of contact between infectious and susceptible people probably consist key epidemiological determinants together with public-health interventions.

Patients admitted to the hospital are classified as follows :

a. patients under observation
b. patients suspected of SARS : Patients having high fever (>38%), cough or breathing difficulty and a report of traveling during the past 10 days to an endemic area or a close contact to a patient with a suspected SARS, but who do not fulfill the criteria of confirmed SARS
c. patients with confirmed SARS according to the following criteria : radiographic evidence of infiltrates consistent with pneumonia, fever higher that 38°C, history of chills, cough, breathing difficulty, general malaise or myalgia and known exposure (travelling to endemic area or contact with a patient with SARS)[2-4]

On 17 April 2003, a month after SARS establishment, the laboratory network announced conclusive

identification of the SARS causative agent : a new coronavirus unlike any other known human or animal virus in its family and complete sequencing of its RNA followed shortly. Thereafter, the possibility of a definite diagnosis and confirmation of the disease were two major epidemiologic determinants towards the elimination of the new infectious disease. The laboratory tests used for the diagnosis of SARS are:

1. **Molecular tests (PCR)** detecting genetic material of the SARS-CoV (corona virus) in blood, stool, respiratory secretions or body tissues. A positive PCR suggests that RNA of SARS–CoV is present in the sample but does not suggest that there is live virus present in a quantity to infect another person, while a negative PCR does not exclude SAARS. Test results may be negative for several reasons:
   a. they are "false negative" b. the patient is not infected with SARS CoV or c. the specimens were not collected when the genetic material of the virus was present.
2. **Antibody tests**
   a. Elisa Test yielding positive results reliably at day 21, detecting a mixture of IgM antibodies in the serum of SARS patients
   b. Immunofluorescence Assays detecting IgM antibodies after about 10 days.
   Positive results indicate a previous infection with CoV
   Negative results : indicate that no infection with SARS-CoV took place
3. **Cell culture**
   Only used to indicate the existence of a live virus, not excluding SARS if negative.
   As mentioned above, public- health interventions play a key role in the management of any infectious disease and the Hospital infection control guidance for SAARS proposed by WHO is:

A. Outpatient settings

a Suspected patients diverted to separate areas to minimize transmission to others
b Patients should be given a face mask to wear
c Staff involved should wear a face mask, eye protection, wash hands before and after contact with any patient
d Patients under investigation should be separated from other cases
e Disinfectants such as fresh bleach solutions should be available at appropriate concentrations

B. Care for probable SARS cases

Probable SARS cases should be isolated and accommodated as follows :

a. in negative pressure rooms with the door closed
b. single rooms with their own bath facilities
c. cohort placement in an area with an independent air supply and bathroom facilities
d. movement of patients outside of the isolation should be avoided.

- Turning off air conditioning and opening windows if independent air supply is unfeasible
- All staff should be trained in the infection control measures
- A member of staff must be identified and have the responsibility to observe others for infection control
- Disposable equipment should be used wherever possible and disposed properly. If devices are reused they should be disinfected according to the manufacturer´s instructions and surfaces should be cleaned with disinfectants with known antiviral activity
- Visitors –if allowed- should be kept to a minimum, supervised and issued with personal protective equipments(PPE)
- Handwashing is crucial : access to clean water is essential. Hands should be washed before and after contact with patients and after removing gloves
- PPE (face mask, single pair of gloves, eye protection, disposable gown, apron, footware that can be decontaminated) should be worn by all staff, visitors, persons cleaning the room (using a broad spectrum disinfectant)
- Linen used should be put into biohazard bags

Health authorities worldwide are seeking effective public health interventions in the continuing epidemic of SARS.

WHO in its report of 20 May 2003 on the status of the outbreak and lessons for the immediate future, states that:

- WHO maintains its position that SARS can and must be contained –pushed back out of its new human host
- One by one, the many puzzling features of this new disease are being unmasked
- One by one, the most severe outbreaks in the initial waves of infection are being brought under control
- Recommended measures are working
- With this reassurance, the image of populations masked because of fear, the public face of SARS, can now begin to fade.

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