



Bulletin No. 7

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Severe Acute Respiratory Syndrome: Evaluation and Diagnosis

On February 26, 2003, Dr. Carlo Urbani in Hanoi, Viet Nam reported the first case of Severe Acute Respiratory Syndrome (SARS), to the World Health Organization (WHO). By April 18, 2003, 3,461 SARS cases, with 170 deaths, were reported from 17 countries on three continents. During that same time period, 184 suspected and 36 probable SARS cases were reported to the U.S. Centers for Disease Control and Prevention (CDC). There have been no deaths from SARS in the U.S. to date.

An Alaska SARS case is ruled out

On April 7, 2003 the Alaska Section of Epidemiology received a call from an Anchorage hospital reporting that a patient with possible SARS was enroute to the emergency department. The patient, a 51-year-old cargo airline pilot, had arrived from Hong Kong the previous day. On the morning of April 7 he awoke with fever, sore throat, and a cough productive of yellow sputum. On exam, he did not appear ill but had a temperature of 103°F. His respirations were 20 per minute, heart rate was 104 beats per minute and his blood pressure was 135/93 mm Hg. His chest x-ray demonstrated mild discoid atelectasis at the right lung base. Oxygen saturation was 95% and the complete blood count showed $3.9 \times 10^3/\mu\text{L}$ leukocytes (75% neutrophils), a hemoglobin of 17.8 g/dl and hematocrit 51.4%. A rapid direct influenza test was positive for influenza A. The clinical findings and influenza results were discussed with CDC and SARS was ruled out. Viral cultures sent to the Alaska Virology Laboratory were positive for influenza A one week later.

Clinical presentation of SARS

The usual age range of persons with SARS has been 25 to 70 years. The incubation period for SARS is 2 to 7 days but may be as long as 10 days.

Table 1: Clinical presentation and mortality of SARS

<p>Prodrome: Fever (often high), with or without chills and rigors. May include headache, malaise, respiratory symptoms myalgia and diarrhea.</p> <p>Lower respiratory phase: Begins 3 to 7 days after onset of prodrome and includes a dry, nonproductive cough which may progress to dyspnea and hypoxemia. Up to 20% of patients need mechanical ventilation.</p> <p>Chest x-ray: May remain normal or may develop focal interstitial infiltrates that progress to generalized infiltrates or areas of consolidation.</p> <p>Laboratory: White blood cell count is usually normal or decreased early in the disease. Later, 50% of patients have leukopenia and low-normal platelet counts (50,000--150,000/μL). Elevated creatine phosphokinase levels (as high as 3,000 IU/L) and hepatic transaminases (two to six times the upper limits of normal) may be present. Renal function is usually normal.</p> <p>Mortality: The case-fatality rate for patients meeting the current WHO case definition of SARS is approximately 4%.</p>
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Identification of etiologic agent

On April 16, 2003 the World Health Organization announced that a new coronavirus, never before identified, was the cause of SARS. Thirteen collaborating laboratories in 10 countries rapidly isolated and characterized the virus. Causality was confirmed after the virus caused SARS-like disease in an experimental animal model. Currently laboratory testing for the SARS virus is available only at the CDC in Atlanta. *Within the next few weeks we expect SARS testing to be available at the Alaska State Public Health Laboratories as well.*

Evaluation and diagnosis of suspected SARS

1. Review the patient's symptoms and exposure history using the current CDC case definition. (The case definition is updated periodically and can be found at the CDC SARS Internet site, address below.)

Table 2: Interim U.S. case definition of SARS (4/18/03)

<p>SUSPECT CASE</p> <p>Respiratory illness of unknown etiology with onset since February 1, 2003, and the following criteria:</p> <ul style="list-style-type: none"> ◦ Measured temperature $>100.4^\circ\text{F}$ (greater than 38°C) AND ◦ One or more clinical findings of respiratory illness (e.g. cough, shortness of breath, difficulty breathing, hypoxia, or radiographic findings or either pneumonia or acute respiratory distress syndrome) AND ◦ Travel[†] within 10 days of onset of symptoms to an area with documented or suspected community transmission of SARS (mainland China and Hong Kong Special Administrative Region; Hanoi, Vietnam; Singapore; and Toronto, Canada) OR Close contact* within 10 days of onset of symptoms with a person known to be a suspect SARS case. <p>PROBABLE CASE</p> <p>A suspect case with one of the following:</p> <ul style="list-style-type: none"> ◦ Radiographic evidence of pneumonia or respiratory distress syndrome ◦ Autopsy findings consistent with respiratory distress syndrome without an identifiable cause
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[†]Travel includes transit in an airport in an area with documented or suspected community transmission of SARS

* Close contact is defined as having cared for, having lived with, or having direct contact with respiratory secretions and/or body fluids of a patient known to be suspect SARS case.

2. **If the patient meets the case definition of SARS, notify the Section of Epidemiology immediately** at 907-269-8000 during work hours, or 1-800-478-0084 after hours. Epidemiology will assist in case evaluation, specimen collection and shipping, and contact investigation.
3. Obtain the following diagnostic tests: chest radiograph, pulse oximetry, blood cultures, sputum Gram's stain and culture, as well as tests for influenza A and B, respiratory syncytial virus, and other respiratory pathogens.
4. Save unused clinical specimens (respiratory, blood, and serum) for additional testing, pending a specific diagnosis.

Treatment

At present, treatment for SARS is supportive care. Although antiviral agents such as oseltamivir and ribavirin have been used to treat SARS patients, preliminary *in vitro* studies of these drugs has been disappointing. Steroids administered orally or intravenously have also been used in combination with ribavirin and other antimicrobials, however there have been no clinical trials to determine efficacy. The most effective treatment regimen, if any, is unknown.

Internet resources:

CDC - <http://www.cdc.gov/ncidod/sars>

WHO - <http://www.who.int/csr/sars/en/>

Section of Epidemiology - <http://www.epi.alaska.gov>

(Submitted by Beth Funk, MD, MPH, Alaska Section of Epidemiology.)