Thus, clinicians and patients now have several choices for treatment that are effective and feasible for most patients. With additional research, better understanding of the mechanisms mediating UI should emerge and with it the hope for still more effective tools to help the hundreds of millions of individuals who experience UI worldwide.20

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REFERENCES

Is SARS Just ARDS?

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A 43-YEAR-OLD WOMAN WITH NO PRIOR MEDICAL HISTORY presents to an emergency department with cough and fever and is treated for bronchitis. She returns 3 days later with dyspnea and a chest radiograph reveals bilateral lower lobe opacities. Progressive respiratory failure leads to hospital admission and ultimately to intubation and mechanical ventilation. For intensivists around the world, this scenario is not an uncommon presentation for patients diagnosed with acute respiratory distress syndrome (ARDS). The only difference is that this patient with ARDS has the additional history that she “recently returned from a trip to Hong Kong China” and therefore has severe acute respiratory syndrome (SARS).

Pneumonia is the leading risk factor for ARDS in almost all case series, however, the percentage of cases associated with viral infection is not well known because viral pathogens are not routinely sought in adults who are immuno-competent. Viruses known to cause ARDS include influenza, adenovirus, varicella, and hantavirus. In one of the earliest formal descriptions of the syndrome, Ashbaugh et al attributed the etiology to viral infection in 4 of the 12 ARDS cases. Of course SARS is not just ARDS. The medical response to the SARS epidemic extends well beyond the intensive care unit (ICU) and involves primary care clinicians, public health officials, microbiologists, and veterinarians. SARS also has had a profound impact on an already slumping world economy. However, in the ICU, as demonstrated by the 2 carefully documented case series from Toronto and Singapore published in this issue of THE JOURNAL, SARS is essentially ARDS plus intensified respiratory isolation. These investigators describe a total of 84 critically ill patients—38 who were admitted to 13 hospitals in Toronto and 46 who were admitted to Tan Tock Seng Hospital in Singapore. These case series and others described in the press indicate that a critical tool for respiratory support in patients with ARDS is prone ventilation. Oversed by the 2 more recent case series, the 2003 JAMA article by Rubenfeld and colleagues assessing the use of prone ventilation for categorized patients with ARDS, this tool may play a critical role in managing patients with SARS. It is important to recognize the potential for cross-contamination among patients with SARS and ARDS, and to take appropriate precautions to ensure the safety of patients and caregivers. 

See also pp 367 and 374.

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Singapore. Ninety percent of the critically ill patients were diagnosed with ARDS or acute lung injury.9 The mortality rate was 48% (95% confidence interval, 37%-60%), which is similar to mortality seen in recent reports of outcome of ARDS in patients with pneumonia.10 Risk factors for mortality in critically ill patients with SARS appear to be the same as the risk factors for mortality in ARDS from other causes: age, comorbidity, and acute physiologic derangement.11,12

Handwashing and sterile technique have become standard practice in the ICU in an effort to prevent physicians from infecting patients.13 Universal precautions are used routinely to prevent infection of health care workers from blood-borne pathogens in the era of human immunodeficiency virus and hepatitis C virus. However, these measures are relatively innocuous compared with the clinical and psychological impact of providing intensive care with strict respiratory isolation.14 The stress of caring for colleagues infected with SARS is compounded by the constant concern of health care workers becoming ill themselves, or worse, infecting their loved ones at home. How to deliver intensive care efficiently and compassionately while protecting oneself and others from infection will be some of the most important lessons for intensivists to learn from the SARS epidemic.

It may seem shortsighted to focus on the ICU management of a disease with a potentially global impact. However, at least in developed countries, patients with SARS who become severely ill will be cared for in an ICU and will have a high mortality rate. In this sense, the reports from Toronto and Singapore are both reassuring and troubling. They are reassuring because ARDS is familiar to intensivists; and SARS-associated ARDS, to the extent it is possible to draw conclusions from these case series, looks like ARDS. Interventions to treat profound hypoxemia, including sedation, paralysis, recruitment maneuvers, and high-frequency oscillatory ventilation, were used in these patients reflecting the severity of their lung injury. Patients with airway involvement presenting with bronchospasm, profuse secretions, or intrinsic positive end-expiratory pressure, which might have been expected with an inhaled pathogen, did not appear to be a significant problem. Although a variety of treatment decisions were made by individual clinicians caring for these patients, including use of corticosteroids, immunoglobulin, and antiviral medication, it is difficult to assess their efficacy from the 2 case series.

These case series of SARS and critical illness also are troubling. Realizing that SARS causes ARDS simply highlights how little is known about caring for patients with ARDS. Recent estimates from the United States suggest that acute lung injury is associated with more deaths than emphysema or AIDS,15 yet, ironically, ARDS is listed by the National Organization for Rare Disorders.16,17 Although mortality rates in ARDS are declining, many patients who survived are severely impaired.18 Every day clinicians caring for the critically ill patients with SARS had to formulate solutions to clinical questions for which answers are unknown. What is the role of immunosuppressive therapies in ARDS? How should ventilator-associated pneumonia be diagnosed and treated? Should patients with ARDS receive diuretics to try to reduce pulmonary edema or fluids to improve oxygen delivery? Does lung recruitment affect outcome or does it just improve oxygenation? How early and aggressively should patients with ARDS be fed? How can the weakness, depression, and impaired health status seen in patients who have survived ARDS be prevented or treated? Frequently, clinicians do not even agree on the syndrome's diagnosis.19

In managing ARDS, the unequivocal lesson supported by data from extensive laboratory research and confirmed by clinical trials is that use of mechanical ventilation with lower tidal volumes and inflation pressures reduces mortality.20 Recent data from the ARDS Network trial, an NIH funded research consortium, shows that 1 life is saved for every 11 patients treated with a tidal volume of 6 mL/kg predicted body weight targeting plateau airway pressures to less than 30 cm H2O compared with patients treated with 12 mL/kg predicted body weight.21 Despite review by an independent panel of experts, the study continues to generate debate.22 At least part of this debate revolves around the claim that physicians were using lower tidal volumes and plateau pressures in patients with ARDS prior to the ARDS Network clinical trial.23 However, 2 large observational studies of patients who have undergone mechanical ventilation indicate that physicians used nearly identical ventilator settings, on average, regardless of whether the patient had ARDS or whether there was another reason for use of mechanical ventilation.1,24 These studies also showed considerable variability in the selection of tidal volumes for individual patients.

Critics also have argued that specific tidal volume targets are arbitrary and unnecessary as long as clinicians target safe plateau pressures.20 Recent analysis of the data from the ARDS Network clinical trial suggests that this is not true and that a safe plateau pressure threshold has not been identified. Comparing the 200 patients with the lowest plateau pressures in both arms of the trial demonstrated that patients who had a safe plateau pressure of 26 cm H2O of 12 mL/kg predicted body weight had a mortality rate of 34% compared with similar patients with a plateau pressure of 20 cm H2O of 6 mL/kg predicted body weight who had a mortality rate of 23%.25 Debates about the optimal method to use mechanical ventilation in patients with ARDS will and should continue, but should not keep clinicians from using a safe ventilator protocol that has been shown to reduce mortality.

SARS has captured the attention of the world as a new, highly infectious disease with high mortality, considerable occupational hazard, and no specific therapy. A coordinated approach to implementing community-based disease prevention and developing specific antiviral therapy is mandatory. Regardless of whether the actual threat to the
public health from emerging infections and bioterrorism agents is as high as the perceived threat, recent events have focused attention on a set of new and very old pathogens: SARS coronavirus, Yesinia pestis, Bacillus anthracis, and Varioila.26-29 Funding to study emerging pathogens and bioterrorism agents has increased considerably in the past 3 years.30 The case series of the critically ill patients with SARS from Toronto and Singapore are important reminders that respiratory infection with these agents leads to death by first causing acute lung injury and multiple organ failure. Funding for research to identify effective treatments for ARDS and for programs to implement these interventions for patients with ARDS will not only benefit patients with SARS, but also will directly benefit critically ill patients around the world who develop ARDS and acute lung injury from far more common pathogens.

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