



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

intended use of the Combitube by nonparamedic first responders, with previous documentation of successful insertion by emergency medical technicians providing basic life support in our emergency medical services (EMS) system.² We believe that out-of-hospital personnel with experience in endotracheal intubation should use a laryngoscope to facilitate Combitube insertion. This not only displaces oropharyngeal soft tissue but also creates a straighter trajectory for the Combitube, which is substantially more rigid than an endotracheal tube.

The use of the more flexible Small Adult Combitube appears to be a viable alternative to the use of a laryngoscope to facilitate insertion. Substantial evidence exists from operating room data that the Small Adult Combitube is easily inserted and provides adequate ventilation to the vast majority of patients, regardless of body size. Future EMS research should evaluate this strategy with regard to success rate, adequacy of ventilation, and incidence of complications including aspiration and oropharyngeal trauma. In addition, potential limitations with regard to these factors should be explored specifically in larger patients. It is quite possible, however, that the Small Adult Combitube will emerge as the ideal salvage airway device for all out-of-hospital patients.

Again, I would like to express my appreciation for the interest in our article. Only through the intelligent exchange of ideas can we identify optimal strategies for airway management and resuscitation of critically injured patients.

Daniel P. Davis, MD
Department of Emergency Medicine
University of California—San Diego
San Diego, CA

doi:10.1016/j.annemergmed.2004.01.033

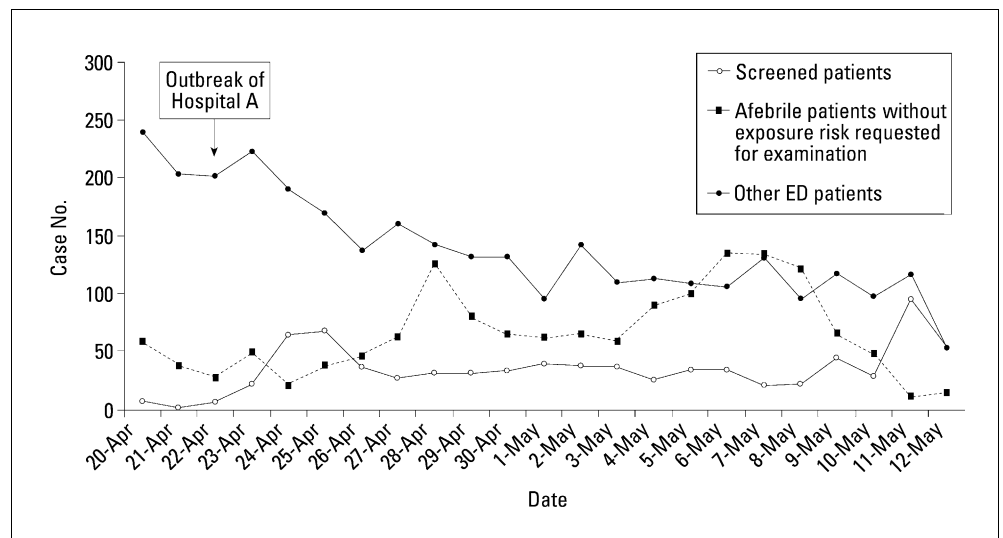
1. Richards CF. Piriform sinus perforation during esophageal-tracheal Combitube placement. *J Emerg Med.* 1998;16:37-39.
2. Ochs M, Vilke GM, Chan TC, et al. Successful prehospital airway management by EMT-Ds using the Combitube. *Prehosp Emerg Care.* 2000;4:333-337.

Facing an Outbreak of Highly Transmissible Disease: Problems in Emergency Department Response

To the Editor:

Dr. Augustine's¹ admonishment in the January 2004 issue of *Annals* on the potential shortcomings of the current emergency care system in dealing with severe acute respiratory syndrome (SARS) pointed out the need for increased emergency department (ED) vigilance. Having reported the first SARS case in Taiwan and fought the consecutive cluster outbreaks in the nearby hospitals, our hospital encountered what Dr. Augustine describes. Therefore, we would like to share the 3 main problems we encountered during the outbreak of SARS; namely, ED staff management, ED overload from patients with airway symptoms but who were unaffected by SARS, and the prolonged stay of highly contagious patients in the ED waiting to be admitted.

Figure 1 (Chen).
ED patient category.



First, the recent trend of hospital retrenchment has taken its toll in the face of health catastrophes.¹ The situation was worsened by the highly contagious nature of SARS, which took many health care providers off their services for quarantine purposes. After the endemic outbreak of SARS, manpower shortages rapidly became worse. Fourteen of our fellow staff members (4 physicians and 10 nursing staff) were kept in quarantine because they had interacted with SARS patients without proper protection.

Second, the surge of patients became challenging. A large number of individuals who had no documented fever or exposure history presented to the ED with minimal airway symptoms. These “worried-well” patients with multiple unexplained physical symptoms outnumbered the patients with actual exposure risk (from April 22 to May 12, 2003, 1,421:789) (Figure 1). The conditions became more complicated with the presence of SARS patients who had no traceable contact history. Providers of emergency medical services were forced to treat every patient with an equal level of vigilance and an equal amount of time. The necessity of clarifying the chronological symptomatology of SARS and of developing a set of prediction rules for triaging SARS among febrile patients became imperative.²⁻⁴

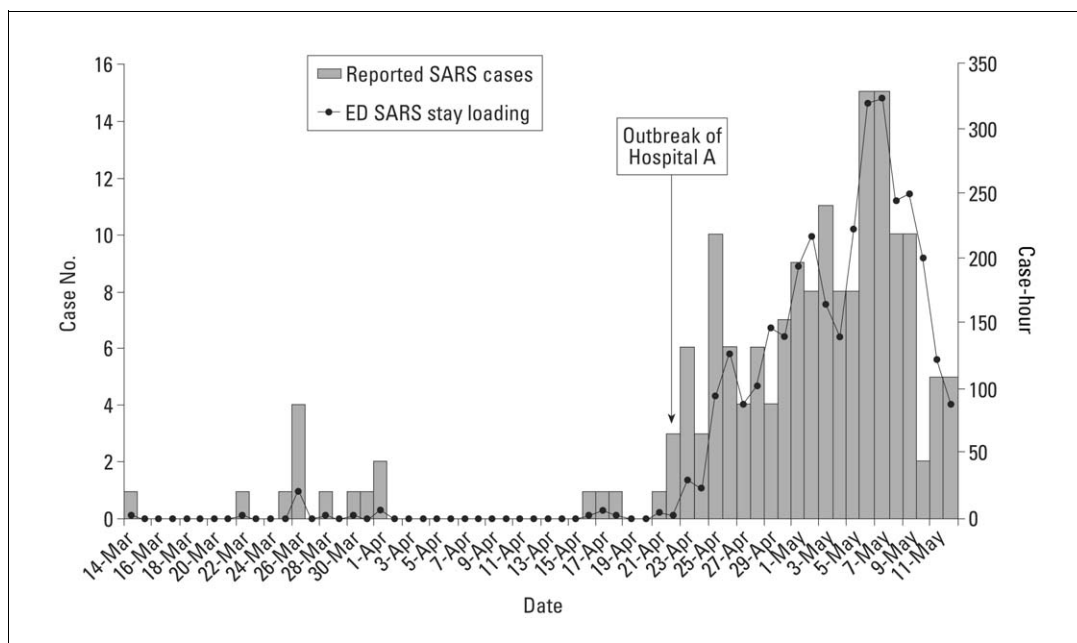
Finally, EDs and hospitals alike were endangered when crowded with highly contagious patients waiting to be admitted. In March 2004, the Taiwan Center for Disease Control policy required that all suspected SARS patients be admitted to respiratory isolation rooms to

eliminate any possibility of nosocomial transmission. After the endemic outbreak and the pouring of patients into our ED, adhering to this policy created a huge burden on the ED staff because the average length of stay in the ED waiting for the opening of isolation rooms increased from an average of 3.1 to 23.1 hours (Figure 2). For ED staff, prolonged stay and crowding of SARS patients increased the risks of exposure to the virus from the patients and the environment. Tests for SARS-coronavirus polymerase chain reaction were positive in 7.6% (9/119) of our ED environmental samples. To lessen the risk of facility contamination, outdoor screening stations were later set up to alleviate the environmental viral burden when a large number of febrile patients from the community had to be screened.⁵

Dr. Augustine¹ has the foresight to point out the current deficiency of emergency medical services in dealing with the SARS epidemic. Our experience echoed his argument. The emergency medical services community should learn from the experience of their colleagues in combating SARS and prepare themselves for the next public health catastrophe.

Shey-Ying Chen, MD
Matthew Huei-Ming Ma, MD, PhD
Chan-Ping Su, MD
Wen-Chu Chiang, MD
Patrick Chow-In Ko, MD
Ting-I Lai, MD

Figure 2 (Chen).
ED SARS loading.



Shyr-Chyr Chen, MD
 Wen-Jone Chen, MD, PhD
 Department of Emergency Medicine
 National Taiwan University Hospital, College of Medicine
 National Taiwan University
 Taipei, Taiwan

doi:10.1016/j.annemergmed.2004.01.028

1. Augustine JJ, Kellermann AL, Koplan JP, et al. America's emergency care system and severe acute respiratory syndrome: are we ready? *Ann Emerg Med.* 2004;43:23-26.
2. Chen S-Y, Su C-P, Ma MH-M, et al. Predictive model of diagnosing probable cases of severe acute respiratory syndrome in febrile patients with exposure risk. *Ann Emerg Med.* 2004;43:1-5.
3. Su C-P, Chiang W-C, Ma MH-M, et al. Validation of a novel severe acute respiratory syndrome scoring system. *Ann Emerg Med.* 2004;43:34-42.
4. Chen S-Y, Su C-P, Ma MH-M, et al. Sequential symptomatic analysis in probable severe acute respiratory syndrome cases. *Ann Emerg Med.* 2004;43:27-33.
5. Tham K-Y. An emergency department response to severe acute respiratory syndrome: a prototype response to bioterrorism. *Ann Emerg Med.* 2004;43:6-14.

In reply:

We appreciate the points made by Dr. Chen and colleagues, as well as the addition of materials regarding preparation of emergency departments (EDs) for severe acute respiratory syndrome (SARS). We acknowledge the work performed in serving the patients and the community where SARS made such an impact. As China once again faces the challenge of the disease, Vietnam struggles to contain "bird flu," and the United States recovers from the stress of handling a widespread outbreak of influenza, we are reminded that the management of contagious disease outbreaks is a constant challenge. The lessons learned by emergency providers worldwide are a valuable source of preparation materials for future occurrences.

US emergency system and hospital leaders must prepare their personnel and processes for the broad range of nuclear, chemical, and biologic agents that potentially can sicken community members and health care providers. SARS is among the most dangerous of these agents and should be used as a model for hospital and emergency system preparedness. We should press for the development of ED surveillance systems that will provide the timely information needed by frontline care providers to protect emergency personnel.

Chen et al point out that emergency leaders need to forge a unified approach to SARS outbreaks with hospital leadership. Necessary steps include devising a new and safer approach to greeting patients in the ED, increased use of appropriate personal protective equipment, and the rapid expansion of protected patient care areas. As experience has shown, an outbreak of SARS and other highly virulent contagious diseases can severely disrupt the routine processes of medical care and threaten the lives of health care providers and citizens alike. Every community, region, and nation must be prepared to meet this challenge by adequately preparing for the next recurrence of SARS, pandemic influenza, and other international health threats.

James J. Augustine, MD
 Arthur L. Kellermann, MD, MPH
 Department of Emergency Medicine
 Emory University
 Atlanta, GA

doi:10.1016/j.annemergmed.2004.01.029

IMAGES IN EMERGENCY MEDICINE (continued from p. 86)

Diagnosis:

The radiograph demonstrated a widened and irregular proximal humerus. In addition, the ionized calcium was less than 3.8 mg/dL, and the clinical suspicion was confirmed. The diagnosis was nutritional rickets resulting from vitamin D deficiency contributing to hypocalcemic seizures.

Rickets in infants from inadequate vitamin D intake and decreased exposure to sunlight may present as seizures in the emergency department. The risk factor is dark-skinned, exclusively breast-fed infants on a vegan diet. Radiographically, decreased mineralization of the bone is characteristic of rickets. Widening of metaphyses, cup-shaped metaphyses, diffuse osteopenia, rib flaring, and multiple fractures in various stages of healing are also characteristic findings. An appropriate evaluation includes CBC count, as well as measurement of calcium, magnesium, phosphate, blood urea nitrogen, and creatinine levels. The clinician should obtain parathyroid hormone, alkaline phosphatase concentrations, and assays for 25-hydroxyvitamin D and 1,25-hydroxyvitamin D. The pediatrician and dietician can formulate a diet rich in calcium to correct the hypocalcemia and impaired development of the child. The American Academy of Pediatrics states that it is prudent to recommend that all breast-fed infants be given supplemental vitamin D.