Biothreat Agents and Emerging Infectious Disease in the Emergency Department

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KEYWORDS

• Emerging infectious disease • Bioterrorism • Biosecurity • Biothreats
• Health security

KEY POINTS

- An astute emergency medicine clinician can minimize the cascading effects of an infectious disease emergency.
- The use of diagnostic tools to make a specific diagnosis is key.
- Early infectious disease consultation is advised with any uncertainty.

INTRODUCTION

Emergency physicians in every location in the world, in developed and developing countries alike, will undoubtedly be confronted with the possibility of an emerging infectious disease in their career. A subset of these physicians may be faced with a patient who has potentially been exposed to biological weapons. Of the myriad infectious disease emergencies an emergency physician contends with, these 2 possibilities are the gravest and most impactful. In such scenarios, the emergency department (ED) clinician can be the key in recognizing or containing an outbreak.

The challenge inherent with emerging infectious diseases presenting in the ED is that such cases can be camouflaged, lurking amongst innumerable infectious disease clinical syndromes, from common colds to viral rashes. This article provides guidance to emergency physicians as to how to approach this challenging problem as well as familiarizing readers with specific microbial threats of high consequence.

DEVELOPING A GENERAL APPROACH

A key method for detecting the presence of an emerging infectious disease syndrome or a biological weapons exposure in an ED patient is to develop a general approach

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that seeks out key historical and physical examination clues. This approach is not different from what is included in a full history and physical examination but requires meticulous attention to certain aspects of the history.

Travel History and Situational Awareness

Travel history becomes a key focus of the history because many infectious diseases, especially of the emerging variety, have delimited borders in which they are prevalent. The travel history must be coupled, however, with situational awareness as to what infections are known to be present in specific parts of the world. Such a task is daunting for most physicians and, therefore, it is important that they know where such resources can be found. Both the Centers for Disease Control and Prevention (CDC) (www.cdc.gov/travel) and ProMED (Program for Monitoring Emerging Diseases) (www.promedmail.org) are 2 such resources that are easy to access and continually updated. Using these resources, a busy provider can quickly assess which specific infection risks any given country might confer.

An important component of the travel history is understanding the dates of travel and how they relate to the incubation period of specific infections. Travel must be contextualized and integrated with incubation period, because domestic infections acquired before or after travel might be mistaken for a travel-related infection.

Additionally, EDs in a given geographic locale (eg, metropolitan area, county, or state) should develop a mechanism to have insight into changes in ED volume, chief complaint mix, and unusual diagnoses at other EDs in the region. Much of this can be accomplished through leveraging emergency health care coalitions and local or state health departments to develop tools to enhance insight into the vicissitudes of a given region's ED-relevant infectious disease problems through syndromic surveillance programs.

Exposure History

An important component of an individual's risk for particular infections is related to exposures. Attention must be paid to animal exposures (domestic and wild), eating habits, occupation, and hobbies. Additionally, it is essential to determine if a person has had any sick contacts or has attended a mass gathering, because an ED physician might be seeing one of the first formal presentations of a wider outbreak.

SPECIFIC AGENTS

Of the specific biological agents, the category A agents (anthrax, plague, tularemia, and botulism), and certain viral hemorrhagic fevers (VHFs) (eg, Ebola, Marburg, Machupo, and Lassa fever) are of the highest priority. **Table 1** provides salient points regarding the treatment of the category A biothreat agents.

In all cases of uncertainty, prompt consultation with an infectious disease physician is recommended.

Anthrax

Anthrax is caused by the gram-positive bacillus, *Bacillus anthracis*. It is a ubiquitous spore-forming gram-positive bacterium that is found naturally in the soil worldwide. It is a disease of herbivores. Humans can contract 1 of 4 forms of the infection: cutaneous, inhalational, injectional, and gastrointestinal.[1,2] Of these forms, cutaneous is by far the most common and represents a majority of cases.[3] An intentional release of anthrax is expected to result in primarily inhalational cases.[1] Anthrax is not contagious from person to person and no special precautions are required.[4]