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Infectious Disease Pathology: Unraveling the Diagnosis in a Bioterrorist Event

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Infectious disease pathologists have a longstanding history of contributing to the diagnosis and identification of infectious disease agents. Pathologists are characteristically among the first health care workers involved in recognizing infectious disease outbreaks and hence are in an excellent position to discover new zoonotic diseases, other emerging infectious disease syndromes, and bioterrorist events. Among the techniques employed by pathologists to diagnose and study infectious diseases are histopathology, electron microscopy, immunohistochemistry (IHC), in situ hybridization (ISH), and polymerase chain reaction (PCR).

The objective of this presentation is to prepare pathologists and other health care workers to recognize, diagnose, and report a potential bioterrorist event at the earliest moment. Depending upon the etiologic agent, this knowledge may direct effective diagnosis, treatment and public health measures to prevent spread. Emphasis will be on recognition and diagnosis of these threatening diseases initially by the anatomic pathologic approach. The differential diagnosis of these entities as well as systematic and syndromic pathologic approaches to achieve an etiologic diagnosis will also be discussed.

Traditional methods such as special stains can be helpful in identifying bacterial agents. On the other hand, electron microscopy is an extremely powerful tool in the rapid identification of viral agents. Additionally, specific IHC and direct fluorescent assays (DFA) for the Category A terrorism agents have been developed and are available at CDC. These tests can be performed on formalin-fixed tissues. The presentation will focus of the differential diagnosis on unusual outbreaks of pneumonia, encephalitis, hemorrhagic fever, and rash illness in the context of a potential bioterrorist released agent. The diseases to be discussed will include anthrax, smallpox, tularemia, plague, and viral hemorrhagic fevers. The talk will also underscore the critical role of pathology in investigating potential bioterrorism events and in guiding epidemiologic studies, a role that was clearly demonstrated in 2001 when *B. anthracis* spores were intentionally released through the U.S. postal system.