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Sesión plenaria: Symposio sobre bioterrorismo, grandes amenazas epidémicas y bioseguridad: sesión I (problemática y agentes)

Auditorium, Facultad de Farmacia
Martes 20 de Julio: 8.30-10.30

171.- Recent challenges in infectious diseases: biological pathogens as weapons and emerging endemic threats

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The twentieth century was a time for a logarithmic rise in scientific knowledge and technologic capability which has continued exponentially in the twenty-first century. Science and technology are inherently of "dual use", in that the knowledge and the technology can be used to cause great good or great harm. Among the sciences none is more ambiguous and more complex in terms of dual use issues than biology. Thus, the global proliferation of technologies applicable to biological warfare and terrorism has become among the greatest threats to public health.

Natural pandemics and deliberate covert introduction of threat agents share in common the need for a significant response by the health care community. It is critical in both natural outbreaks and outbreaks triggered by a deliberate covert introduction of a threat agent, to provide a rapid definitive identification and rapid response to the causative agent in order to reduce its "footprint". The footprint in the context of morbity and potential mortality, from a natural or terrorist release of a given agent may be the same; but the footprint from a terrorist release has potentially far more profound psychological, economical, and national security aspects. This presentation puts in perspective emerging infections with the biological agents whose characteristics make them likely potential threat agents. It introduces the pathobiological, biochemical, molecular, and medical laboratory aspects of living agents or organic products of potential use in warfare, terrorism, or criminal activities. It then provides an understanding of the clinicopathologic features of potential threat agents and their toxins. Routes of host entry, the pathophysiology of host reactions, the specific cellular, biochemical, and molecular pathology in target organs and diagnostic techniques for living agents or organic products are discussed. Environmental and agricultural issues of biological agents and toxins are included. Mechanisms for providing a rapid clinicopathologic diagnosis of animal and zoonotic diseases used by terrorist are addressed. New equipment for rapid detection, including molecular techniques, and hand-held equipment are introduced. Mention of techniques to distinguish innocent from questionable use of dual-use high tech equipment will be discussed. Forensic investigation and the function of the pathologist, microbiologist, and toxicologist in chain of custody, legal, and political issues is explained. An understanding of the policy and decision-making issues will be addressed.

172.- Bioterrorism: the European Union response

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Urgent measures have been taken from October 2001 onwards by the European Union following the terrorist attacks in the US, including the posting of anthrax spores during September and October 2001. These measures, both legislative and non-legislative, aim for the most part to ensure that there is a minimum of safety and security base in each of the Member States of the European Union and that their plans and actions are properly co-ordinated. The measures span most of the sectors of activity and make extensive use of internal and external policies of the European Union.

Key elements of current EU initiatives on countering chemical, biological and radiological agent threats concern the health sector, especially public health. However, other sectors, such as research, agriculture, medicinal product authorization and marketing, transport and energy are also directly concerned by health security issues.

In public health, a major programme composed of twenty five actions grouped under a few key objectives was prepared and agreed quickly following calls for action by EU heads of government and Health Ministers. It is being implemented since December 2001[1].The health security programme aims at establishing effective and permanent co-operation in the EU on preparedness and response to biological and other agent attacks and threats: provision of an EU-wide capability for the timely detection and identification of biological and chemical agents in laboratories, the rapid and reliable determination and diagnosis of relevant human disease cases, the availability of medicines, co-ordination of emergency plans and the laying down of rules and guidance on counter-measures. It links with and is supported by research and actions in other EU policies. It forms a key component of the overall EU action on terrorism and of the European Security Strategy.

A key mechanism for raising the alert and for the coordination of measures on bioterrorism in the EU is the Health Security Committee which was established by the EU Health Ministers in November 2001. This high-level group helps drive implementation of the health security programme together with an EU Task Force comprised of experts from the EU Member States and Commission officials as well as national officials in the various Member States.

To establish secure communications between the competent authorities in the EU, a 24 hour/7 day-a-week rapid alert system (RAS-BICHAT), has been set up and is operational since June 2002. It is linked to and complements the EU's Early Warning and Response System for the prevention and control of communicable diseases[2]. It hooks up with EU alert systems on risks related to communicable disease outbreaks, food, feed, animals and plants and to that on radiological emergencies. Case definitions for bioterror agents have been laid down by EU law which should be used for Member States to report to each other and to the Commission on outbreaks of disease[3]. Ten clinical diagnosis and case management guidelines have been adopted on bioterror agents and have been submitted for publication.

An amendment to the pharmaceutical legislation on liability for non-authorized products for bioterror-related purposes is currently being discussed at the European Parliament and the Council. Guidelines have been issued on the use of medicines against potential pathogens and guidance has been provided on the development of vaccinia virus-based vaccines against smallpox. Moreover, information has been obtained and shared, on a restricted basis, on stocks of bioagent vaccines and antibiotics in Member States and general information has been agreed to be collected on medical resources for disaster medicine purposes.

Tests of communication channels and evaluation of national emergency plans will be conducted during an exercise for biological and chemical release events that is scheduled for 2004-2005. A network of high security laboratories has been formed consisting of laboratories in the Member States and a ring test and a quality assurance project are being prepared. Networks including laboratories for other high and medium-level pathogens are also in the planning phase.

The EU is a key partner in international co-operation to counter bioterrorism. It co-operates closely with the WHO and is a founder party to the Global Health Security Initiative that has been agreed by the G7 and Mexican Health Ministers and the EU Health Commissioner in Ottawa on 7 November 2001.

(1) Commission of the European Communities, COM (2003) 320 on progress with the implementation of the health security programme, 2 June 2003 (at: europa@cec.eu.int).
(2) Official Journal of the European Communities, L 268, 3.10.1998, p. 1.
(3) Official Journal of the European Communities, L 184, 23.7.2003, p. 35.

173.- Bioterrorism: viral agents as weapons of mass destruction

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One of the current threats in bioterrorism, the intentional release of an infectious agent or toxin, is of major concern to experts worldwide. Within the group of biological threat agents are toxins and replicating microorganisms. Within the latter group are fungi, bacteria, and viruses. Viruses are obligatory intracellular parasites of very small size and defined morphology. As a group, they are refractory to antibiotics. Experts have identified several viruses that have the potential to be used with the intent to cause significant harm to human, animal, or agricultural targets when released or disseminated. Release of viral species that do not naturally occur in a geographic area could cause significant disease and death in an immunologically naïve population. Highly virulent strains released at sufficiently concentrated doses by effective routes have the potential to cause significant morbidity and mortality. Without effective vaccines, therapies, or preventive measures, both urban and rural populations are vulnerable to such exposures. Epidemiological surveillance and preventive medical skills are key countermeasures.

This presentation will discuss viruses that could potentially be used with the intent to harm human populations. These viruses can be grouped into three classes using the symptoms they induce in the human host: (i) viruses that cause encephalitis; (ii) viruses that cause hemorrhagic fevers; and (iii) members of the poxvirus species. These groupings are independent of the traditional virus classification that uses the viral genome (RNA *versus* DNA), their morphological symmetry, and the presence of a lipid envelope, among others. Within the group of encephalitis-causing viruses are the Equine Encephalitis viruses, West Nile virus, and Japanese encephalitis viruses. Members of the hemorrhagic fever causing viruses include Yellow Fever and Dengue virus, Rift Valley fever virus, Ebola and Lassa fever virus. The two most prominent poxviruses to fall into the groups discussed here are Variola (or Smallpox) and Monkeypox virus. In addition, many of these viruses belong to the arthropod-borne viruses (Arboviruses). As their name indicates, insect vectors naturally transmit these viral pathogens, but other transmission routes are possible, such as infection by aerosol. The natural and any alternate mode of transmission introduce complex challenges in terms of disease presentation, and the understanding of viral pathogenesis and immune responses by epidemiologists and health care workers.

This lecture will introduce the challenges faced in diagnosing these viral infections. Many of these viruses initially cause non-specific flu-like symptoms that can be difficult or impossible to distinguish from a variety of viral syndromes such as the common cold. Other early symptoms may include high fever, lymphadenopathy, myalgia, bone and joint pains, headache, and a rash with maculopapular characteristics. It will be up to the expertise of the physician, nurse, epidemiologist, and other health-related scientists to identify a potential threat and initiate appropriate actions. This presentation will provide information to assist identifying these viruses and describe their characteristics.

The views expressed are those of the authors and do not reflect the official views of NCRR-NIH-DHHS, the Uniformed Services University, the US Army, or the United States Government.

174.- Biological weapons and microbial engineering bioprocessing. A survey to control dual use material

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Our talk is based, on one side on experience connected to the UNMOVIC training course based on procedures used for monitoring and inspection on site and analysis of documents on Iraq's biological weapons, on the other side, on analysis of the trends in microbial biotechnology and bioengineering during the last 40 years.

We shall focus on dual use equipment and production of biological weapons.

Analysis of documents on the state of art, during 1980/1990 years in Iraq gives the incredible conviction that all the programs in fashion during 40 years to solve problems highly honorable for “man kind”, supported by international organizations and programs like single cell proteins and food, biofuels and renewable carbon source, health, green technologies and biopesticides permit to acquire knowledges for biological weapons.

We shall take as example, single cell proteins form petroleum, acetonolbutylic fermentation (clostridia) and biofuels, biopesticides (bacillus), vaccines production and we shall demonstrate that the break through linked to these research where used for production of biological weapons.

We shall describe some processes of production by dual use equipment: microbial starters production, SCP, baker yeast, antibiotics, vaccines, from the micro-organism culture collection to the technological itinerary of production and formulation to propose a control of these factories by pattern profiling.

We shall conclude that it is possible to forget high tech procedures of production of biological weapons to develop “invisible” ways of production by right tech or low technologies difficult to control.