IMPROVING THE MANAGEMENT OF HIV DISEASE

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HIGHLIGHTS OF A SYMPOSIUM SERIES:
An Advanced Course in Antiretrovirals, Prophylaxis, and the Treatment of Opportunistic Diseases

Health Care Worker Occupational Exposure to HIV

Occupational exposure of health care workers (HCWs) to HIV was discussed at the Chicago meeting by Harold A. Kessler, MD, from Rush-Presbyterian St Luke’s Medical Center in Chicago. As related by Dr Kessler, education regarding occupational exposure to HIV and training in universal precautions for preventing exposure constitute the only effective methods for reducing risk of occupation-related HIV infection in HCWs.

According to Dr Kessler, approximately 2 million of the 5 to 6 million individuals involved in health care services in this country can be considered at risk for percutaneous or mucous membrane exposure to patient blood or body fluids. Although current epidemiologic data indicate that HIV infection among HCWs is predominantly related to nonoccupational factors, occupational exposure carries a quantifiable risk of transmission and transmission does occur in this setting. According to Dr Kessler, the risk of HIV transmission for a defined, high-risk exposure appears to have remained stable over several years of tracking by the Centers for Disease Control and Prevention (CDC) at approximately three to four cases per 1000 exposures (0.3% to 0.4%). It is estimated that 800,000 sharps-related injuries occur in HCWs each year; if it is estimated that approximately 1% of hospital admissions are HIV-infected, then it can be hazarded that as many as 24 HCWs per year become infected through such exposures (800,000 x .01 x .003). As related by Dr Kessler, risk differs accord-

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Inoculation to type of exposure, with hollow core needle exposure carrying greater risk than solid core needle exposure and much greater risk than mucous membrane or skin exposure. He noted that he is unaware of any documented cases of solid core needle transmission; several cases of transmission via mucous membrane or skin exposure have been documented.

With regard to documented cases of transmission, CDC statistics as of September 1993 indicate a total of 39 cases of confirmed seroconversion following occupational exposure, including 15 lab technicians, 13 nurses, 5 physicians, 1 pathologist, and no surgeons. Of these cases, 35 were associated with percutaneous exposure and 36 with exposure to blood. In most cases, inoculation was due to unexpected movement by patient or coworker. Needle recapping injury, a common form of high-risk exposure prior to institution of educational efforts at limiting this type of accident, has been cited in only six of the cases. In addition, 81 cases in which HCWs were found to be HIV seropositive on first postexposure testing have been reported and are considered highly suspicious for occupational transmission given the absence of other identifiable risk factors.

**Study of exposure: inoculation without infection?**

Recent findings by Dr Kessler and colleagues, including investigators at the National Cancer Institute, suggest that the low overall risk of HIV transmission following high-risk exposure may not be due to absence of actual inoculation of the virus. In this study, peripheral blood mononuclear cells (PBMCs) of eight HCWs having needlestick exposure to HIV and nine HCWs having similar needlesticks involving patients not infected with HIV were regularly evaluated for specific T-helper lymphocyte response to five immunogenic synthetic HIV-1 gp160 peptides (T1, T2, Th4.1, P18-IIIb, and P18-MN). T-helper cellular response was measured as interleukin-2 (IL-2) production; positive response was defined as at least a 4-fold increase in IL-2 production from antigen-stimulated PBMCs for at least two of the peptides. During up to 64 weeks of follow-up, positive response, suggesting prior priming of T-helper cells with an antigen at least related to the HIV proteins, was observed in six of eight HCWs with HIV exposure and in one of nine controls (P < 0.008); overall, there were six responses to each of the five anti-gens in the former group and one response to three of the five in the latter group. All of the HIV-exposed HCWs remain free of HIV infection according to HIV antibody, p24 antigen, polymerase chain reaction (PCR), and viral culture findings. Kinetics of the cellular response indicate a lag time of 8 to 12 weeks, followed by a peaking of immunologic reactivity and waning of reactivity back to baseline levels, suggesting that no permanent immunologic memory is induced. It is unknown whether the observed T cell responses are associated with a protective effect.

**Comprehensive management plan**

Dr Kessler outlined a comprehensive program for management of HIV exposure comprising the major components of preexposure education, immediate postexposure care, postexposure counseling, and long-term postexposure care; elements of the program are shown in Table 3. With regard to preexposure education, Dr Kessler stressed the importance of effective teaching and utilization of universal precautions as the primary mechanisms for reducing risk of transmission; he predicted that some type of high-risk procedure training would eventually be mandatory.

In summarizing the role of antiviral prophylaxis in postexposure care, he stated that there have been 13 documented failures of zidovudine prophylaxis, which is widely used in this setting, including five cases of massive exposure; in a subsequent question and answer period, it was noted that in one European case, intravenous zidovudine started within 1 hour of exposure failed to prevent infection. In the absence of an extremely large-scale controlled trial, there currently is no way of obtaining definitive evidence of efficacy; animal models of zidovudine prophylaxis have yielded inconclusive results. At least two cases of transmission of zidovudine-resistant HIV are known; as noted by Dr Kessler, since there may be a greater likelihood of encountering zidovudine-resistant HIV in the hospital setting, with patients being likely to have advanced disease and to have undergone prolonged therapy, zidovudine may not be an optimal prophylaxis choice. According to Dr Kessler, no systematic data on the prophylactic use of didanosine, zalcitabine, interferon, or drug combinations are available.