Pediatric Considerations for Postexposure Human Immunodeficiency Virus Prophylaxis

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KEYWORDS

• Human immunodeficiency virus • Postexposure prophylaxis
• Blood-borne infections • Needlestick • Antivirals

KEY POINTS

- Recent Centers for Disease Control and Prevention guidelines for nonoccupational postexposure HIV prophylaxis (nPEP) include updated antiretroviral recommendations, recommendations for not initiating nPEP if the exposure was more than 72 hours earlier, and specific testing indicated for the exposed patient.
- Data supporting nPEP recommendations are expert opinion based on animal studies and case series in humans, because randomized trials are not feasible.
- Pediatric considerations include availability of antiretrovirals (ARV) in appropriate dose forms and drug formulations, which influence adherence to the nPEP regimen.

INTRODUCTION

Exposures to blood and body fluids confer a risk of transmission for blood-borne diseases, including human immunodeficiency virus (HIV), prompting a need for evidence-based recommendations to minimize the risk of acquisition of this infection in certain situations. Initial suggestions that antiretroviral (ARV) treatment could prevent transmission of HIV after sexual, intravenous (IV) drug use, or other nonoccupational exposure[1,2] were extrapolated from recommendations made for occupational exposure to HIV, which were themselves influenced by a retrospective case-control study demonstrating that health care workers with a documented percutaneous

Potential/Perceived Conflicts of Interest: None.
Statement of Financial Support: No financial assistance was received to support this study.
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Infect Dis Clin N Am 32 (2018) 91–101
https://doi.org/10.1016/j.idc.2017.10.006 **id.theclinics.com**

exposure to HIV-infected blood had a significantly reduced risk of HIV seroconversion associated with the exposure when they received zidovudine after the exposure.[3]

Although many practitioners offered nonoccupational postexposure prophylaxis (nPEP) to individuals with high-risk exposures, the number of unanswered questions regarding efficacy, toxicity, and other risks (eg, development of resistance, behavior changes, and cost)[4] delayed any official US recommendations for nPEP until 2005.[5] At that time the US Department of Health and Human Services Working Group on Nonoccupational Postexposure Prophylaxis recommended the following:

- A 28-day course of highly active ARV therapy for individuals with nonoccupational exposures to blood, genital secretions, or other potentially infected body fluids from an HIV-infected person, when the exposure occurred within 72 hours of starting ARVs;
- A case-by-case evaluation of the risks and benefits of highly active ARV therapy in individuals with similar nonoccupational exposures, when the HIV status of the source individual was unknown but the exposure represented a substantial potential risk for transmission;
- If the exposure did not represent a substantial potential risk for transmission or if the exposure was more than 72 hours before presentation, no ARVs were recommended;
- However, ARVs could be considered, weighing risks and benefits, if the exposure was more than 72 hours from the time of starting ARVs but represented a serious risk for transmission.

The preferred ARV nPEP regimen in the 2005 guidelines was either efavirenz plus (lamivudine or emtricitabine) plus (zidovudine or tenofovir), or lopinavir/ritonavir plus (lamivudine or emtricitabine) plus zidovudine.

The Department of Health and Human Services guidelines for nPEP were updated in 2016.[6] The changes in recommendations with this update included the following:

- Specifying that individuals being considered for nPEP be tested for HIV, preferably by a rapid test;
- nPEP in individuals with exposure more than 72 hours before presentation was specifically not recommended;
- Specific recommendations for additional testing and treatment that would be indicated based on the details of the exposure, and for counseling or intervention services in individuals at risk for frequently recurring HIV exposure, including consideration of pre-exposure prophylaxis (PrEP).

The 2016 guidelines also updated the preferred ARV regimen for healthy adults and adolescents to include tenofovir with emtricitabine plus raltegravir, or tenofovir with emtricitabine plus darunavir/ritonavir.

This article discusses some of the evidence informing the 2005 and 2016 guidelines for nPEP, with a specific focus on the pediatric population. In addition, possibilities for future interventions are presented.

EVIDENCE SUPPORTING THE RECOMMENDATIONS OF THE 2016 NONOCCUPATIONAL POSTEXPOSURE PROPHYLAXIS GUIDELINES

Data Supporting the Use of a 28-Day Course

The choice of 28-day nPEP treatment duration is largely based on studies in animal models and evidence of clinical efficacy from case series of patients. Macaque models using simian immunodeficiency virus (SIV) challenge have provided useful