Perinatal Human Immunodeficiency Virus (HIV) Testing

Task Force on Pediatric AIDS

PERINATAL INFECTIONS

The primary route of human immunodeficiency virus (HIV) infection in infants is vertical transmission from HIV-infected mothers. This is of particular concern as the number of infected women and the number of children infected by perinatal transmission continue to increase rapidly. The number of perinatally acquired acquired immunodeficiency syndrome (AIDS) cases increased 17% in 1989 and 21% in 1990. Similarly, the number of heterosexually acquired AIDS cases increased 27% in 1989 and 40% in 1990. There is evidence that vertical transmission of HIV can occur in utero (congenital/transplacental, similar to rubella), \(^{12}\) in the postpartum period (breast-feeding), and perhaps in the intrapartum period (similar to hepatitis B). \(^{3}\) The relative frequency and efficiency of transmission during each of these periods remains uncertain. The best estimates of vertical transmission from an HIV-seropositive mother to the fetus range from 12.9% to 39%. \(^{4-6}\) Although the risk of transmission appears to be increased in women who are symptomatic, this point is still unclear. \(^{5}\) Preliminary information suggests that the presence of high levels of high-affinity/avidity antibodies to specific epitopes of the gp 120 of HIV may be protective and may decrease or prevent vertical transmission, \(^{7-10}\) although others have not been able to confirm this finding. \(^{11}\)

More detailed information on perinatal HIV infection, \(^{12}\) and infection control \(^{13}\) in pediatric HIV infection is available in previously published statements from the AAP Task Force on Pediatric AIDS.

SEROPREVALENCE

Anonymous seroprevalence data from newborn specimens are being collected in 44 states, Puerto Rico, and the District of Columbia. In some states, seroprevalence data are available by metropolitan area and/or by hospital of birth. Data from completed surveys are available from 38 states. \(^{14}\) The overall US seroprevalence rate from these studies is 1.5/1000 although there is at least a tenfold geographic variation. Seroprevalence is highest in metropolitan areas, but it is increasing in small (50 000 to 100 000 population) urban and rural areas. It is important that anonymous seroprevalence testing be continued and expanded to monitor trends in maternal infection and estimates of future cases of pediatric HIV infections.

It should be noted that because the HIV antibody is transferred passively, testing of newborns provides only seroprevalence data for their mothers and does not prove infection of the newborn. New laboratory tests have been developed that may allow early (<6 months of age) identification of HIV infection in young infants. These tests include viral culture, polymerase chain reaction, in vitro antibody production, and detection of HIV-specific IgA or IgM antibodies (where the sensitivity has been enhanced by preabsorption with protein G). \(^{15-22}\) At present, the use and interpretation of these tests should be limited to centers experienced in their evaluation.

ACCESS TO CARE

To justify a successful perinatal HIV counseling and testing program, women and their families must have access to care, including developmental screening and care programs for newborns. However, counseling and testing programs that may benefit the mother, fetus, and newborn cannot be delayed until access problems have been resolved completely. Services must be provided for the families as well as for individual HIV-infected women and should include psychosocial, behavioral, and clinical support. Care systems based on case management are particularly suited for the care of the family and must include counseling before and after testing. Assessment and reduction of risks should be part of initial counseling; however, testing should be offered to all and not based solely on self-identified risk factors. \(^{23}\) Testing should be done only with pretest education, written informed consent, including the risks and benefits of testing for themselves and their infants, and posttest counseling on the meaning and implications of test results.

COSTS

The costs of perinatal HIV testing include direct costs such as counseling, obtaining informed consent, testing, follow-up and managing HIV-seropositive individuals, and indirect costs such as time and travel for those tested. There are other costs that are tangible although these are often difficult to quantify precisely. These costs include functional impairment due to psychologic distress while awaiting test results and after learning a test is positive, as well as adverse social consequences, including ostracism and loss of employment, with resulting loss of health insurance and other discrimination. Seropositive persons, including those who are false-positive, also experience adverse consequences associated with complications of medical treatment. However, because of the ex-
extraordinary high specificity of the enzyme-linked immunosorbent assay and Western Blot tests (>99.9%) the positive predictive value will be high (and negative predictive value low), even in low-prevalence areas.

The costs of identifying persons who are HIV-seropositive are often compared with the savings associated with potentially reduced medical care expenses that may result with early intervention. In general, society is willing to pay for medical benefits, but not in excessive amounts, particularly when there are countless interventions of proven benefit for which resources could also be allocated. Therefore, it is customary to calculate the cost of achieving any specific outcome via cost-effectiveness analysis. Because both mother and infant benefit from perinatal HIV screening, costs for benefits to each need to be calculated according to documented efficacy (eg, cost for prolonged time the infant is free of infection, cost of hospitalization averted, cost per episode of pneumonia averted, cost per case identified, and cost of averting a subsequent infant at risk for HIV infection). Cost-effectiveness analysis is an essential part of the ongoing evaluation of the effectiveness and appropriateness of any testing program. Currently, the limited data about the efficacy of early treatment of HIV infection and the magnitude of psychological and social costs that accompany testing makes meaningful cost-effectiveness analysis an extraordinary problem that may become easier as our information base improves.

RISKS AND BENEFITS

A newborn who is HIV-seropositive has an HIV-seropositive mother; therefore, testing newborns using existing methods constitutes indirect maternal testing. As such, some women may be deterred from seeking prenatal care.

If identification of affected infants is associated with treatment, such testing is indicated. Therefore, short-term and long-term risks of treatment must be included in an assessment of risks of neonatal testing. This is of particular concern since at least two thirds of those infants who are HIV-seropositive will not be infected and may be exposed to risks of treatment that could possibly be harmful with no potential benefit.

Other risks of perinatal HIV testing are inherent in identifying any HIV-infected patient and are due primarily to anxiety and societal stigmatization.

The major medical benefits of perinatal testing and identification of HIV include a possible increase in life expectancy and better quality of life through the prevention, delay, or alleviation of HIV-related symptoms. Intravenous immunoglobulin has been shown to prolong the time of development of serious bacterial infection in HIV-infected children with CD4 (T4 helper) cell counts of greater than 200. Zidovudine has been shown to be beneficial in both adults and children. Pneumocystis carinii pneumonia prophylaxis using trimethoprim-sulfamethoxazole or aerosol pentamidine has been shown to be beneficial for HIV-infected adults, and trimethoprim-sulfamethoxazole is beneficial for children with leukemia. While the benefit of such prophylaxis in HIV-infected infants and children has not been demonstrated in a controlled trial, Pneumocystis carinii pneumonia in infants often presents fulminantly and has a high mortality rate, particularly in infants younger than 12 months. Therefore, guidelines have been developed and prophylaxis is recommended for children based on age-adjusted CD4 cell counts. To summarize, the potential medical benefits to mothers and infected newborns include: (1) reduced morbidity due to intensive health and developmental supervision, including chemoprophylaxis, Pneumocystis carinii pneumonia prophylaxis, prophylaxis and early treatment of bacterial infections, and appropriate immunizations; (2) an opportunity for early antiretroviral therapy; (3) the provision of information regarding the risk of transmission from breast milk and the risk of vertical transmission in subsequent pregnancies; and (4) possible prevention of sexual transmission through education of the mother and father.

However, even when there are medical benefits for HIV-infected children, there may be other reasons to oppose mandatory testing. Mandatory (involuntary) testing may not necessarily be the most effective way to ensure that the largest number of children are tested.

RECOMMENDATIONS

The American Academy of Pediatrics believes that counseling and testing for HIV should be available to both men and women (regardless of a woman’s pregnancy status) and should be recommended to many of these individuals. HIV antibody testing programs should be voluntary and accompanied by appropriate education, counseling, informed consent, and confidentiality. In addition, testing programs and policies should reflect cultural, ethnic, and community values. A newborn who is HIV-seropositive has an HIV-seropositive mother; therefore, testing newborns using existing methods constitutes indirect maternal testing.

The following recommendations specifically address the perinatal period:

1. HIV testing should be routinely offered to all pregnant women and women of childbearing age throughout the United States by informing them of availability of counseling and testing.
2. HIV testing should be routinely recommended and encouraged for all pregnant women and women of childbearing age at increased risk of HIV infection because of high-risk behaviors or because they live in areas (state, metropolitan area, city, etc) with an HIV seroprevalence rate among pregnant women and newborns of 1:1000 or more.
3. Newborn testing should be routinely recommended and encouraged when mothers with known high-risk behaviors or from high-seroprevalence areas have not been tested.
4. HIV testing should be recommended and encouraged for abandoned infants and for infants otherwise in need of foster or adoptive care as needed to
facilitate placement and care. Courts should adopt methods for rapid processing of court orders to allow HIV testing of abandoned infants or those in foster care when follow-up adoption or initial placement may be facilitated by such testing.

5. Testing in the perinatal period should occur under specified policies which ensure retesting, education, informed consent, counseling, and follow-up criteria.

6. Anonymous seroprevalence surveys should be continued and expanded to identify hospital, city, and state seroprevalence information. These surveys are not a substitute for individual counseling and testing, but they provide important public health information.

7. Pilot studies of the benefits of perinatal testing, with careful evaluation of costs, are needed.

8. Specific tests for early diagnosis of HIV infection in infants must be developed further and made readily available to distinguish infection from passive transfer of maternal antibody.

9. Pediatricians or other primary pediatric care givers should be informed whenever an infant is born to a known HIV-seropositive mother so that appropriate care and follow-up testing can be done.

10. It is inappropriate to develop testing programs without addressing access to care. However, testing programs that may benefit the mother, fetus, and newborn cannot be delayed until access problems have been resolved completely.

11. The American Academy of Pediatrics opposes mandatory (voluntary) maternal and/or newborn testing at this time.

REFERENCES


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