INFECTIOUS DISEASES - II

UPDATES IN PEDIATRIC HUMAN IMMUNODEFICIENCY VIRUS INFECTION

*Ira Shah
**Akanksha Jaiswal
***Srushti Gandhi

Abstract: *Human immunodeficiency virus has now evolved from a fatal condition to that of a chronic manageable disease. With newer advances both in antiretroviral drugs and diagnostics, human immunodeficiency virus treatment has become simplified and available to all those who are infected. The recent protocol of prevention of parent to child transmission has simplified therapy as well as holds promise of <2% transmission of human immunodeficiency virus thus almost decreasing new cases of pediatric human immunodeficiency virus. Every pediatrician should have the basic knowledge of retroviral therapy and the current developments. This article gives a review of all the recent advances in pediatric human immunodeficiency virus.*

Keywords: *Human immunodeficiency virus, Diagnosis, Infants, Children, Treatment, Prevention of parent to child transmission, Antiretroviral therapy.*

* Professor and Head
** Clinical Associate
*** Senior Medical Officer,
Pediatric HIV Clinic,
Department of Pediatric Infectious Diseases,
B.J.Wadia Hospital for Children,
Mumbai.
email: irashah@pediatriconcall.com

Points to Remember

- ***Infants born to HIV infected mothers, may continue to have maternal HIV antibodies up to age 24 months and their HIV status should be tested at 24 months to prevent false positive results.***
- ***Apart from NRTI, NNRTI and PI, there are newer classes of drugs such as entry and fusion inhibitors, integrase strand transfer inhibitors (INSTIs).***
- ***As per WHO, ART should be initiated in everyone infected with HIV at any CD4 cell count, regardless of clinical stage.***
- ***Routine viral load testing is encouraged at 6 months followed by 12 months after initiating ART and if stable every year thereafter.***
- ***As per NACO PPTCT guidelines, HIV exposed infant should be started on postpartum ARV prophylaxis for minimum of 6 weeks.***
- ***Exclusive breastfeeding is recommended for 6 months and continued breastfeeds along with complementary feeds from 6 months to 1 year.***
- ***Early infant diagnosis (EID) by virological testing should be done at 6 weeks of age with a repeat testing at 6 months, 12 months and 6 weeks after cessation of breastfeeds.***

References

1. UNAIDS. Trends of New HIV Infections. Available at URL: http://aidsinfo.unaids.org/. Accessed in March 2019.
2. NACO. National Guidelines for HIV-1 Viral Load Laboratory Testing. Available at URL:http://naco.gov.in/sites/default/files/National Guidelines For HIV 1 Viral Load LaboratoryTestingApril2018%20%282%29.pdf. Accessed on 29th April 2019.
3. AVERT Global information and education on HIV and AIDS. HIV strains and types. Available at https://www.avert.org/professionals/hiv-science/types-strains. Accessed on 11th July, 2019.
4. UNAIDS. Guidelines for the Use of Antiretroviral Agents in Pediatric HIV Infection. Available at URL: https://aidsinfo.nih.gov/guidelines/html/2/pediatric-arv/45/whats-new-in-the-guidelines. Accessed on 29th April, 2019.

5. Havens PL, Mofenson LM. American Academy of Pediatrics Committee on Pediatric AIDS. Evaluation and management of the infant exposed to HIV-1 in the United States. Pediatrics 2009; 123:175-187.
6. Hegazi A, Forsyth S, Prime K, Bashh Adolescent Special Interest Group (ASIG). Testing the children of HIV-infected parents: 6 years on from 'don't forget the children'. Sex Transm Infect 2015; 91:76-77.
7. AIDS info. Guidelines for the prevention and treatment of opportunistic infections in HIV-infected adults and adolescents. Available at: http://aidsinfo.nih.gov/contentfiles/lvguidelines/adult_oi.pdf. Accessed on 29th April 2019.
8. Branson BM, Owen SM, Wesolowski LG, Bennett B, Werner BG, Wroblewski KE, et al. Laboratory testing for the diagnosis of HIV infection: updated recommendations. Centers for Disease Control and Prevention. 2014. Available at: https://stacks.cdc.gov/view/cdc/23447. Accessed on 7th April 2019.
9. World Health Organisation (WHO). Mother-to-child transmission of HIV. Available at URL: https://www.who.int/hiv/topics/mtct/en/. Accessed on 29th April, 2019.
10. Lilian RR, Kalk E, Technau KG, Sherman GG. Birth diagnosis of HIV infection on infants to reduce infant mortality and monitor for elimination of mother-to-child transmission. Pediatr Infect Dis J 2013; 32:1080-1085.
11. Jourdain G, Mary JY, Coeur SL, Ngo-Giang-Huong N, Yuthavisuthi P, Limtrakul A, et al. Risk factors for in utero or intrapartum mother-to-child transmission of human immunodeficiency virus type 1 in Thailand. J Infect Dis 2007; 196:1629-1636.
12. Tubiana R, Le Chenadec J, Rouzioux C, Mandelbrot L, Hamrene K, Dollfus C, et al. Factors associated with mother-to-child transmission of HIV-1 despite a maternal viral load <500 copies/mL at delivery: a case-control study nested in the French perinatal cohort (EPF-ANRS CO1). Clin Infect Dis 2010; 50:585-596.
13. Katz IT, Shapiro DE, Tuomala R. Factors associated with lack of viral suppression at delivery. Ann Intern Med 2015; 162:874-875.
14. Momplaisir FM, Brady KA, Fekete T, Thompson DR, Diez Roux A, Yehia BR. Time of HIV diagnosis and engagement in prenatal care impact virologic outcomes of pregnant women with HIV. PLoS One 2015; 10:e0132262.
15. Mandelbrot L, Tubiana R, Le Chenadec J, Dollfus C, Faye A, Pannier E, et al. No perinatal HIV-1 transmission from women with effective antiretroviral therapy starting before conception. Clin Infect Dis 2015; 61:1715-1725.
16. Burgard M, Blanche S, Jasseron C, Descamps P, Allemon MC, Ciraru-Vigneron N, et al. Performance of HIV-1 DNA or HIV-1 RNA tests for early diagnosis of perinatal HIV-1 infection during anti-retroviral prophylaxis. J Pediatr 2012; 160:60-66 e61.
17. Lilian RR, Johnson LF, Moolla H, Sherman GG. A mathematical model evaluating the timing of early diagnostic testing in HIV-exposed infants in South Africa. J Acquir Immune Defic Syndr 2014; 67:341-348.
18. WHO. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach. Second edition. 2016. Available at URL: https://www.who.int/hiv/pub/arv/arv-2016/en/. Accessed on 29th April, 2019.
19. WHO. Updated recommendations on first-line and second-line antiretroviral regimens and post-exposure prophylaxis and recommendations on early infant diagnosis of HIV. Available at URL: https://www.who.int/hiv/pub/guidelines/ARV2018update/en/. Accessed on 29th April, 2019.
20. Wiznia A, Church J, Emmanuel P, Eppes S, Rowell L, Evans C, et al. Safety and efficacy of enfuvirtide for 48 weeks as part of an optimized antiretroviral regimen in pediatric human immunodeficiency virus 1-infected patients. Pediatr Infect Dis J 2007; 26:799-805.
21. Zhang X, Lin T, Bertasso A, Evans C, Dorr A, Kolis SJ, Salgo M, et al. Population pharmacokinetics of enfuvirtide in HIV-1-infected pediatric patients over 48 weeks of treatment. J Clin Pharmacol 2007; 47:510-517.
22. Maraviroc [package insert]. Food and Drug Administration. 2016. Available at https://www.accessdata.fda.gov/drugsatfda_docs/label/2016/208984_022128s017lbl.pdf. Accessed on 29th April, 2019.
23. Agwu AL, Yao TJ, Eshleman SH, Patel K, Huang W, Burchett SK, et al. Phenotypic co-receptor tropism in perinatally HIV-infected youth failing antiretroviral rherapy. Pediatr Infect Dis J 2016; 35:777-781.
24. Raffi F, Jaeger H, Quiros-Roldan E, Albrecht H, Belonosova E, Gatell JM, et al. Once-daily dolutegravir versus twice-daily raltegravir in antiretroviral-naive adults with HIV-1 infection (SPRING-2 study): 96 week results from a randomised, double-blind, non-inferiority trial. Lancet Infect Dis 2013; 13:927-935.
25. Molina JM, Clotet B, van Lunzen J, Lazzarin A, Cavassini M, Henry K, et al. Once-daily dolutegravir is superior to once-daily darunavir/ritonavir in treatment-naive HIV-1-positive individuals: 96 week results from FLAMINGO. J Int AIDS Soc 2014; 17(4 Suppl 3):19490.
26. Viani RM, Alvero C, Fenton T, Acosta EP, Hazra R, Townley E, et al. Safety, Pharmacokinetics and efficacy of dolutegravir in treatment-experienced HIV-1 infected adolescents: 48-week results from IMPAACT P1093. Pediatr Infect Dis J 2015; 34:1207-1213.
27. Wiznia A, Alvero C, Fenton T, George K, Townley E, Hazra R, et al. IMPAACT 1093: Dolutegravir in 6- to 12-Year-Old HIV-Infected Children: 48- Week Results. Presented at: 23rd Conference on Retroviruses and Opportunistic Infections 2016. Boston, MA.
28. Walmsley S, Baumgarten A, Berenguer J, Felizarta F, Florence E, Khuong-Josses MA, et al. Dolutegravir plus

abacavir/lamivudine for the treatment of HIV-1 infection in antiretroviral therapy-naive patients: week 96 and week 144 results from the SINGLE randomized clinical trial. J Acquir Immune Defic Syndr 2015; 70:515-519.

29. Emu B, Fessel J, Schrader S, Kumar P, Richmond G, Win S, et al. Phase 3 Study of Ibalizumab for Multidrug-Resistant HIV-1; N Engl J Med 2018; 379:645-654.
30. Aids Info. Cobicistat. Available at URL: https://aidsinfo.nih.gov/drugs/536/cobicistat/0/patient. Accessed on 29th April, 2019
31. WHO. What's new in treatment monitoring: viral load and cd4 testing. Available at URL: https://www.who.int/hiv/pub/arv/treatment-monitoring-info-2017/en/. Accessed 31st March 2019.
32. WHO. TRANSITION TO NEW ANTIRETROVIRALS IN HIV PROGRAMMES. Available at URL: https://www.who.int/hiv/pub/toolkits/transition-to-new-arv/en/. Accessed on 29th April 2019.
33. World Health Organisation. Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV; 2015: Available at: https://apps.who.int/iris/bitstream/handle/10665/186275/9789241509565_eng.pdf?sequence=1. Accessed on 29th April, 2019.
34. Arribas JR, Thompson M, Sax PE, Haas B, McDonald C, Wohl DA, et al. Brief report: randomized, double-blind comparison of tenofovir alafenamide (TAF) vs tenofovir disoproxil fumarate (TDF), each coformulated with elvitegravir, cobicistat, and emtricitabine (E/C/F) for initial HIV-1 treatment: week 144 results. J Acquir Immune Defic Syndr 2017; 75:211-218.
35. Hill A, Hughes SL, Gotham D, Pozniak AL. Tenofovir alafenamide versus tenofovir disoproxil fumarate: is there a true difference in efficacy and safety? J Virus Erad 2018; 4:72-79.
36. World Health Organisation. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: what's new. 2015. Available at: https://www.who.int/hiv/pub/arv/15249_HIV Treatement and Care_PolicybriefforWEB.pdfAccessed on 29th April, 2019.
37. NACO. Prevention of Parent to Child Transmission. Available at URL: http://naco.gov.in/prevention-parent-child-transmissionpptct. Accessed on 29th April, 2019.
38. UNAIDS. Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV: Available at: https://aidsinfo.nih.gov/guidelines/html/3/perinatal/187/antiretroviral-management-of-newborns-with-perinatal-hiv-exposure-or-perinatal-hiv. Accessed on 29th April, 2019.