Review Article

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Paediatric HIV/AIDS

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Abstract

Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV). It may also be referred to as HIV disease or HIV infection. Following initial infection, a person may experience a brief period of influenza-like illness. This is typically followed by a prolonged period without symptoms. As the infection progresses, it interferes more and more with the immune system, making the person much more susceptible to common infections, like tuberculosis, as well as opportunistic infections and tumors that do not usually affect people who have working immune systems. The late symptoms of the infection are referred to as AIDS. This stage is often complicated by an infection of the lung known as pneumocystis pneumonia, severe weight loss, skin lesions caused by Kaposi's sarcoma, or other AIDS-defining conditions. Since its discovery, AIDS has caused an estimated 36 million deaths worldwide (as of 2012). In 2014 it resulted in about 1.2 million deaths and about 36.9 million people were living with HIV. HIV/AIDS is considered a pandemic—a disease outbreak which is present over a large area and is actively spreading. Genetic research indicates that HIV originated in west-central Africa during the late 19th or early 20th century. AIDS was first recognized by the United States Centers for Disease Control and Prevention (CDC) in 1981 and its cause—HIV infection—was identified in the early part of the decade.

Keywords: HIV; AIDS; CDC; HIV infection.

Introduction

HIV is the greatest health crisis the world faces today.Estimated 40million people living with HIV. 2.7 million children under 15 years are estimated to be infected with HIV.

Global Scenario

HIV is the greatest health crisis the world faces today.Estimated 40 million people living with HIV. 2.7 million children under 15 years are estimated to be infected with HIV. 570,000 children died of AIDS in 2005 . Children account for 18% of the 3.1 million AIDS deaths. Only 40,000 or 4% of the approximately one million people now on treatment are children [1].

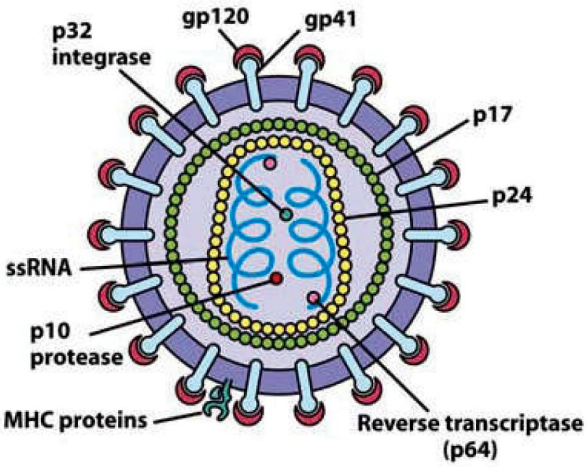

Fig. 1: Anatomy of Human Immunodeficiency Virus

Indian Scenario

Estimated 202,000 children affected by HIV/AIDS.New cohort of approximately 50-60,000 HIV

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infected infants is added every year. Less than 10% of HIV-positive expectant mothers are benefiting from ARV prophylaxis

Anatomy of Human Immunodeficiency Virus

Aetiology

Caused by the Human Immunodeficiency virus

Types I and II

- Type I - Worldwide
- Type II - Common in West African

Transmission

Majority (90%) infected children acquire the infection through MTCT

This occurs during pregnancy, delivery and breastfeeding In absence of any intervention, the risk of MTCT is 15–30% in non breast feeding populations Breastfeeding increases the risk by 5–20% to a total of 20–45% [2].

MTCT rates are <5% in US and Europe with access of appropriate treatment

In utero 25–45%

Intrapartum 65–70% - most rapid course

Postpartum 12–15%

Other Means of Transmission

- Blood transfusions, blood products and organ / tissue transplants
- Contaminated needles
- Sexual intercourse.

Factors Affecting MTCT (Maternal)

- High maternal HIV RNA level
- Low maternal CD4+ T-lymphocyte count
- Chorioamnionitis
- Maternal vitamin A deficiency and malnutrition
- Co exciting sexually transmitted disease
- Clinical states of mother
- Interpartum hemorrhage
- Vaginal delivery
- Artificial rapture of membranes
- Rapture of membranes >4hours
- Fetal scalp monitoring

Transmission Through Breastfeeding

Risk is 14% if sero conversion occurs before birth

Risk is 29% if during breastfeeding

Highest in the first 6 months of life but continues throughout breastfeeding.

Transmission risk increased by

- Seroconversion during breastfeeding
- Mastitis / breast abscess
- Bleeding nipples

Determination of AFASS

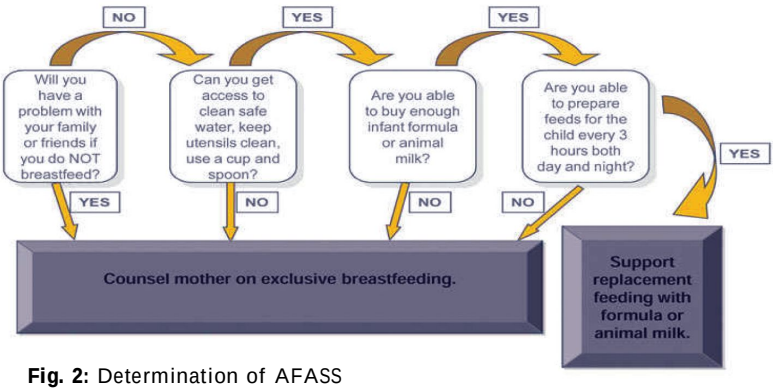

Fig. 2: Determination of AFASS

- High plasma viral load
- Oral thrush in baby
- Mixed feeding (including breast milk)

Prevention of MTCT

In 1997, a joint WHO, UNAIDS, and UNICEF policy Statement called for giving women access to voluntary counseling and testing and information to

allow them make informed decisions regarding infant feeding.

2001 – (WHO) If a woman has tested positive when replacement feeding is affordable, feasible, acceptable,sustainable and safe (AFASS) avoidance of breastfeeding is recommended [3].

Otherwise, exclusive breastfeeding is recommended. It should be short with abrupt cessation. Mixed feeding is discouraged as its promotes transmission.

Prevention of MTCT

Pregnant women who need ARV treatment should receive it in accordance with WHO guidelines

HIV – infected pregnant women who do not have indication for ARV treatment or do not have access to treatment should be offered ARV prophylaxis to prevent MTCT using one of the several regimens know to be safe ZDV from 28wks of pregnancy + single dose NVP during labour and single dose NVP and one week ZDV for infant.

Nevirapine tab 200mg given to the mother during labour and the syrup 2mg/kg given to baby within 72 hours of life reduces transmission by half [4].

This is Current Practice in India

Clinical Features

CNS

- Microcephaly
- Progressive neurological deterioration or spasticencephalopathy
- Developmental delay / regression
- Predisposition to CNS infections.

Respiratory System

- Recurrent infections (pneumonia, sinusitis, otitis media)
- Tuberculosis
- Pneumocystis carinii pneumonia or lymphoid interstitial pneumonitis

Cardiovascular System

- Congestive cardiac failure

Gastrointestinal system

- AIDS enteropathy (malabsorption, infections with various pathogens) leads to chronic diarrhoea resulting in failure to thrive
- Abdominal pains, dysphagia, chronic hepatitis or pancreatitis

Renal AIDS Nephropathy

The most common presentation being nephrotic syndrome

Skin

- Eczema
- seborrheic dermatitis
- candida infections,
- molluscum contagiosum,
- anogenital warts.

Opportunistic Infections

- Pneumocystis carinii pneumonia
- Cyptosporidium
- Epstein Barr Virus
- Measles
- Cryptococcus meningitis
- Toxoplasmosis

Malignancy

- Non Hodgkin's Lymphoma
- Primary CNS lymphoma
- Kaposi sarcoma

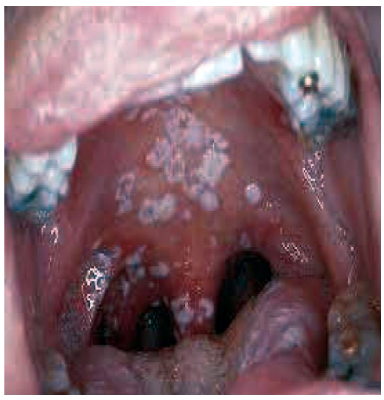

Fig. 3: Oropharyngeal candidiasis

Who Clinical Case Definition of Pediatric Aediatric AIDS

2 major + 2 minor Criteria

Major

- Weight loss of failure to thrive
- Chronic diarrhoea > 1 month}
- Prolonged fever > 1 month } Major

Minor Signs

- Generalised lymphadenopathy
- Oropharyngeal candidiasis
- Recurrent common infections
- Generalised dermatitis
- Recurrent invasive bacterial infection
- Confirmed maternal HIV infection

Diagnosis of HIV Infection

Diagnosis of HIV infected children over 18months can be made by antibody test (ELISA and confirmatory tests)

Specific diagnosis in children less than

15 -18months can be made by virologic tests

HIV DNA polymerase chain reaction (PCR)

HIV RNA Assay

Standard and immune complex dissociated p24 antigen

Viral culture

Tests should be performed at 48 hours of age

-14 days

-1 – 2 months

- 3 – 6 months

HIV infection is absent if there are 2 or more negative viral tests between the age 1 month and 6 months.

HIV infection is present if there are 2 positive viral tests on 2 separate blood samples regardless of age.

In the Absence of Virologic Tests

2 or more negative antibody tests performed by the age of over 6 months with an interval of at least 1 month between tests reasonably excludes HIV infection in exposed children A reactive HIV antibody test at >18 months followed by a positive confirmatory test definitely indicates HIV infection [5].

Treatment Modalities

- Antiretroviral therapy
- Treatment of acute bacterial infections
- Prophylaxis and treatment of opportunistic infections
- Maintenance of good nutrition
- Immunization
- Management of AIDS – defining illnesses
- Psychological support for the family
- Palliative care for the terminally ill child

Antiretroviral Therapy

Goal is to maximally suppress viral replication to ondetectable levels for as long as possible The antiretroviral drugs fall under 4 major categories

Nucleoside reverse transcriptase inhibitors (NRTIs) ZDV, ddI, 3TC, d4T

Non-Nucleoside RTIs, Nevirapine, Efavirenz

Protease Inhibitors: Nelfinavir, Ritonavir

Fusion Inhibitors: Enfuvirtide

Table 1: Antiretroviral Therapy

Antiretrovirals Approved for Use

NRTI	NNRTI	PI	Newer drugs
Zidovudine(AZT)	Nevirapine (NVP)	Nelfinavir	**CCR5 inhibitors :Maraviroc**
Stavudine(d4T)	Efavirenz (EFV)	Indinavir	Integrase inhibitors : Raltegravir
Lamivudine(3TC)	**Etravirine**	Saquinavir	**Fusion inhibitors : enfuvirtide**
Didanosine(ddI)		Ritonavir	
Abacavir(ABC)		Atazanavir/Ritonavir	
Tenofovir(TDF)		Lopinavir/Ritonavir	
Emtricitabine(FTC)		Darunavir	
		Tipranavir	
		Fosamprenavir	

When to initiate ARVAll HIV infected children less than 12 months.Clinical AIDSMild to moderate clinical symptomsMild to moderate immunosuppression Good response to 2NRT1s +1 protease inhibitorSome studies have shown comparible result with 2NRT1s + 1 NNRT1Nigeria ARV – Stavudine,Lamivudine, Nevirapine.

Immunization

All HIV-exposed infants should be fully immunized

Infected and symptomatic infants should receive all vaccines including measles and hepatitis B but not BCG or Yellow fever vaccineInfected and symptomatic children should receive IPV instead of OPV.

Outcome Patterns

15-25% : rapid course median survival 6-9mo if untreated60-80%: median survival 6yrs<5% : long-term survivors with minimal or no progression, low viral loads for > 8yrs.

ART Programme in India

Launched on 1st April, 2004 at 8 institutions in 6 high prevalent states Currently 56 ART centers operational in Medical colleges & some District hospitals Currently 40,000 adults & 1300 children on ARTEstimated that about 8,000 - 10,000 children will require ART in 2014 / 2015.Launched on 1st April, 2004 at **8** institutions in 6 high prevalent states Currently 56 ART centers operational in Medical colleges & some District hospitalsCurrently 40,000 adults & 1300 children on ARTEstimated that about 8,000 - 10,000 children will require ART in 2014 / 2015.

Issues and Challenges

Difficulties in DiagnosisLack of appropriate formulationsDifficulties in dosingCost of FormulationsLack of trained manpower to deliver care & supportSpecial needs of children affected & infected by HIV / AIDS.

Roadmap for Management of Paediatrics HIV/AIDS

Expert Committee Meeting and Review of Pediatric Formulations for ARV Treatment for HIV/AIDS (Sept 04, WHO) National Consultation on Children affected or vulnerable to HIV / AIDS (March 05, UNICEF) Technical committee on ART (Dec 2005,NACO) Indian Academy of Paediatrics (IAP) to finalize Guidelines on all issues related to Paediatrics HIV[6]IAP to finalize ART procurement & Training planWider national , International consultations Goals Paediatric prevention, care and treatment programme Provide prevention, care and treatment for children infected or affected by HIV / AIDS. Provide ART to at least 90% of children living with AIDS at the end of 5 yearsPrevent HIV infection through the PPTCT programme scale-up [7].

Conclusion

Paediatric HIV infection is contributing increasingly to childhood morbidity and mortalityMost cases result from MTCTEffort should be made prevent MTCT complete care provided for infected children and their families.

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