

# Paediatric HIV

# Objectives



- Discuss why paediatric HIV is unique compared to adult HIV
- Describe clinical manifestations of HIV in paediatric patients

# Similarities between adult and paediatric HIV



- Organisms causing disease are essentially the same, virus is the same
- After infancy, CD4 % and viral load correlates well with morbidity/mortality
- Adolescent medicine
  - Course of illness is similar to adults
  - May also have horizontal transmission

# Distinguishing Characteristics Between Adults and Children with HIV/AIDS



- Transmission modes are usually different
- Duration of latency period varies greatly in children
- Children have naïve immune systems that are destroyed before ever developing fully
- Viral loads are usually higher in pediatrics
- Weight-based or body surface area-based dosing that changes over time

# Distinguishing Characteristics Between Adults and Children with HIV/AIDS



- Developmental issues are critical in pediatrics
- Diagnostic challenges
- Fewer medicines available in pediatric formulations
- May affect future height of child in addition to weight
- Disclosure: actual patient vs. other people

# Distinguishing Characteristics Between Adults and Children with HIV/AIDS



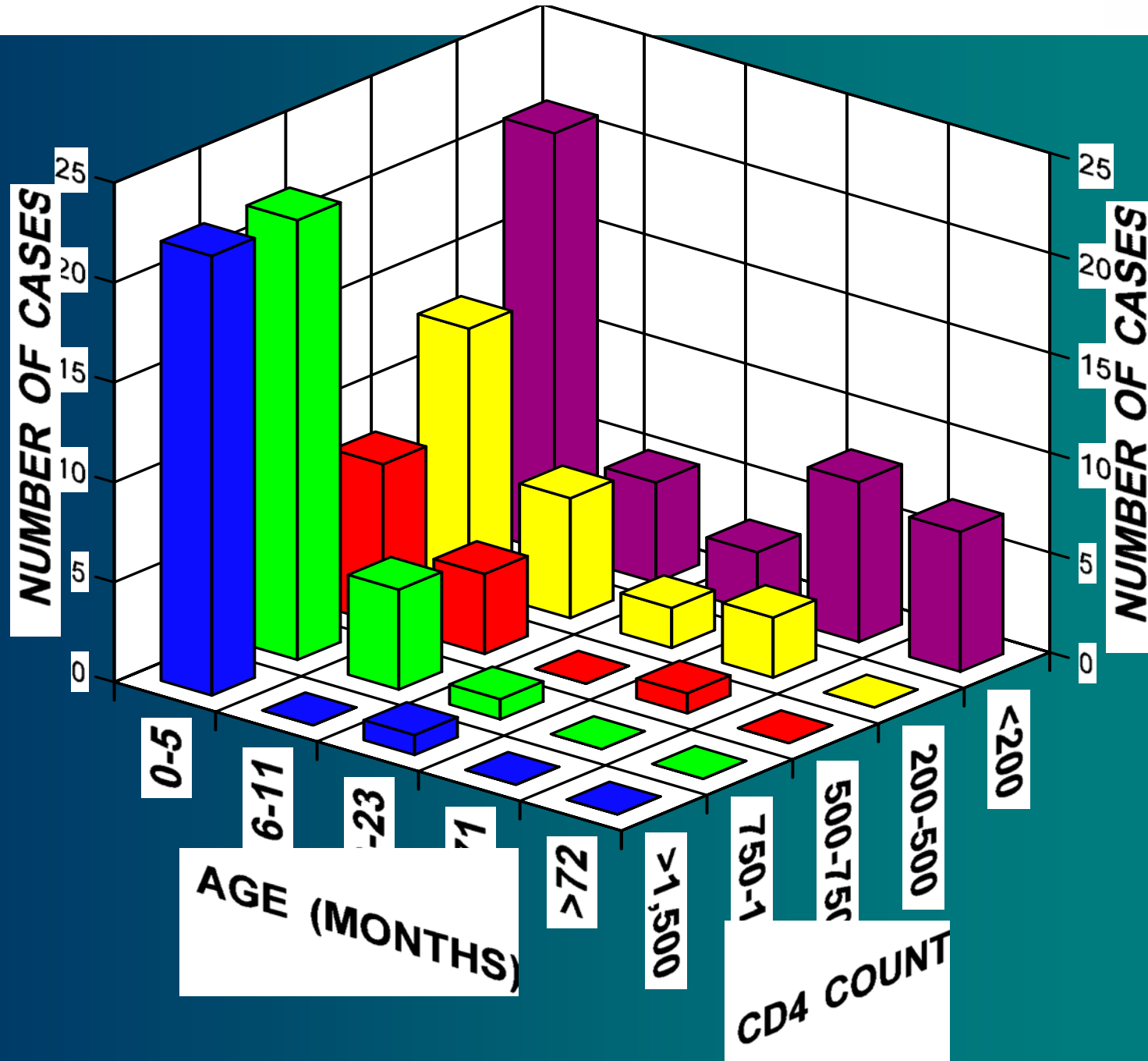
- Adherence issues more challenging
  - Parent/caregiver must remember to give
  - Child must actually take (stubbornness, taste)
  - Multiple caregivers may not communicate well
    - \* May overdose the child and may run out faster
    - \* May assume another caregiver has already dispensed
  - Child may not know WHY s/he is taking meds
- Very variable pharmacokinetics

# Distinguishing Characteristics Between Adults and Children with HIV/AIDS



- CD4 count
  - Decreases with age - does not approximate adult values until 6-12 years of age
    - \* Therefore, absolute CD4 count not as predictive of prognosis and immune status until between 6-12 years of age
  - CD4 percentage is much more useful
  - In infants <12 months of age, neither CD4 count nor percentage are predictive of PCP risk

# Age, CD4 count, and PCP risk in children



# Pediatric HIV Infection



90% of the cases are attributed to vertical transmission:

- Intrauterine
- Intrapartum
- Postpartum via breast feeding

# Vertical Transmission



- Usually there are no signs of infection (no acute retroviral syndrome)
- Signs/symptoms can occur at any time - early infancy or not until adolescence
- Complicating conditions can occur suddenly and unexpectedly

# Diagnosis of HIV in pediatrics



- HIV ELISA: detects antibodies to HIV
  - Helpful in establishing diagnosis in older children
  - In infants, it may reflect maternal antibodies or the child's own antibodies, therefore, it is not diagnostic
- DNA PCR: can be diagnostic as early as 2 days to 2 months of age
  - Is method of choice for diagnosis of infants
  - Is often not available in developing countries
  - Just begun in Nigeria in 2006, will roll out to other sites soon
- RNA PCR (viral load)
  - Can also be diagnostic if positive (rare for child not on ARVs to have undetectable VL)

# Natural History



- Category 1: Rapid progressors
  - Die by age 1 and likely acquired infection in utero or in early perinatal period (25-30%)
- Category 2
  - Symptoms early in life, then downhill course and death by 3-5 years (50-60%)
- Category 3: Long-term survivors
  - Live beyond 8 (2-25%)

# Factors predicting prognosis



- Predictors of disease progression in infants
  - Maternal viral load at delivery
  - Infection before 4 months of age
  - Infant peak viral load
  - Low CD4 count and percentage
  - Rapid decline in CD4
  - Clinical AIDS

# Maternal predictors of infant disease progression



- Maternal viral load at delivery
- Maternal CD4 count < 200
- Rapidly progressive maternal disease
- Maternal death
  - Associated with 2- to 5- fold increase in infant mortality compared to infants born to mothers who survive

# Common Presenting Features of HIV in the First Year of Life



- Normal !!!
- Oral candidiasis
- Lymphadenopathy
- Hepatosplenomegaly
- Recurrent otitis media
- Growth failure
- Fever - recurrent or prolonged
- Developmental delay
  
- **NOTE: SYMPTOMS IN HIV-INFECTED INFANTS MAY OCCUR EVEN AT "NORMAL" CD4 COUNTS FOR AGE**

# Clinical conditions suggestive of pediatric HIV infection



- Signs common in HIV-infected and ill uninfected children
- Signs common in HIV-infected children, uncommon in uninfected children
- Signs very specific to HIV-infection

# Clinical conditions suggestive of pediatric HIV infection



- Signs common in HIV-infected and ill uninfected children
  - Chronic, recurrent otitis with ear discharge
  - Persistent or recurrent diarrhea
  - Severe pneumonia
  - TB
  - Failure to thrive
  - Marasmus

# Clinical conditions suggestive of pediatric HIV infection



- Signs common in HIV-infected children, uncommon in uninfected children
  - Severe bacterial infections, esp. if recurrent
  - Persistent or recurrent oral thrush
  - Bilateral painless parotid enlargement
  - Generalized persistent non-inguinal lymphadenopathy
  - HSM
  - Persistent or recurrent fever

# Clinical conditions suggestive of paediatric HIV infection



- Signs very specific to HIV infection
  - PCP
  - Esophageal candidiasis
  - LIP
  - Kaposi's sarcoma
  - Lymphoma
  - Extrapulmonary cryptococcosis
  - Invasive salmonella infection

# Parotid gland enlargement



- Usually bilateral, non-tender
- Often seen in slower progressors
- Often associated with lymphoid interstitial pneumonitis
- Can lead to disfigurement, psychological distress
- Occasionally becomes tender and inflamed
  - Prescribe antibiotics and analgesics

# Paediatric pulmonary conditions



- Bacterial pneumonias
- Tuberculosis – diagnostic challenges are more pronounced in paediatrics
- Lymphocytic interstitial pneumonitis
- Bronchiectasis

# Lymphocytic interstitial pneumonitis (LIP)



- Common presentation in HIV-1 infected children.
- Reported prevalence 30- 40%, in chronic lung disease-up to 60%.
- Possible pathogenesis
  - HIV+ EBV (Epstein Barr virus) co-infection leading to immune stimulation with lymphoid infiltration and chronic inflammation
- Recurrent cough and dyspnoea
- Associated with PGL, parotid enlargement, hepatomegaly, poor response to TB therapy

# Miliary TB vs. LIP



Clinical features	Mil TB	LIP
• Res. distress	-/+	+++
• Perst. fever	++	++
• Wasting	+++	-/+
• Parotid enlarg.	-	++
• Digital clubbing	-	++
• Hepatomegaly	++	++

# Bronchiectasis



- May occur as complication of severe/recurrent pneumonia, TB, LIP.
- There is damage to bronchial lining, weakening of bronchi with cystic formation and secondary infection
- Chronic cough with purulent sputum, bad breath, digital clubbing, recurrent pneumonia.
- Supportive- chest physiotherapy and postural drainage
- Broad spectrum antibiotics, appropriate if sputum culture result available

# Development



- One of the clear goals of caring for HIV-infected children is to promote normal development
- Lack of achievement of new milestones or loss of previously attained milestones are markers of disease progression
- Care of HIV-infected children should thus closely monitor a child's developmental progress

# CNS manifestations



- CNS of HIV-1 infected children can be affected by HIV-1 itself, other infections and malignancies as a result of immunosuppression.
- Opportunistic infections less common in children. (Clinical practice- Bacterial, cryptococcal, and TB meningitis).
- Primary CNS lymphomas.

# HIV encephalopathy



- Primary HIV-1 infection of the CNS
  - Reported in 21% in HIV-1 infected African children
  - Delay, arrest or loss of dev. milestones
  - Developmental delay- early manifestation of HIV infection

# HIV encephalopathy-diagnosis



- Diagnosis- clinical mostly, includes at least two of following for at least 2 months
  - Delay or loss of developmental milestones, of intellectual ability
  - Impaired brain growth or acquired microcephaly
  - Symmetrical motor deficits e.g paresis, gait disturbance
  - CT scan- diffuse brain atrophy

# Encephalopathy - Management



- Reduce viral load- HAART
- HAART may prevent, stabilize, or reverse encephalopathy
- Ensure adequate nutritional status, as poor nutrition will hamper a child's development

# GI manifestations: diarrhoea



- Diarrhoea is most common cause of morbidity and mortality in children < 1 year of life in HIV-infected children.
- Tends to be prolonged, complicated by malnutrition and dehydration
- Susceptible to all the infectious agents that HIV-negative children are exposed to, PLUS
  - Also susceptible to same opportunistic infections in adults

# GI manifestations: diarrhoea



- Persistent diarrhoea occurs in increased frequency in HIV-infected children as opposed to those who are HIV-negative
- Persistent diarrhoea is associated with 11-fold increase in mortality in HIV-infected compared to uninfected children

# Malnutrition



- HIV-infected children at increased risk because:
  - Decreased food intake
    - \* anorexia, mouth/throat infections, food acquisition problems if economically disadvantaged
  - Increased nutrient loss
    - \* diarrhoea, malabsorption, enteropathy
  - Increased metabolic rate
    - \* HIV itself, Ols

# Malnutrition



- Malnutrition is exacerbated by high burden of infections/infestations
- Many children born to HIV+ mothers may be low birth weight/underweight
- Micronutrient deficiencies (Vitamins A, C, E, B6, B12 and zinc, selenium)

# Remember!



- Children are not adults in smaller doses!
- Paediatric HIV does have similarities to adult HIV but there certainly are things that make paediatric HIV unique