Pediatric ART: Case Studies

International Center for AIDS Care and Treatment Programs
Columbia University
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Pediatric ART: Case Studies

A Tired Child
Case Presentation

- A woman comes in for her regular appointment. She brings her 2 ½ year old son with her.
- The woman is doing well and does not currently need treatment.
- The doctor notices that the child seems a little listless.
- During previous visits he was always very busy and active, but today he seems tired.
- When asked, mom notes that he hasn’t been himself.
Case Presentation

• The doctor suggests that the child be evaluated by the medical team. He walks the mom and her son over to the pediatric clinic

• The nurse who works in the pediatric clinic is in her office and agrees to see the child

• The pediatrician is on leave and will be back in a few days

• The nurse speaks with mom who reports that her child is more irritable and tired than usual
Clinical Question

• What do you want to know from the mother?
Case Continuation

• The child was enrolled into the clinic with his mom, dad and newborn sister 6 months ago
• He is HIV-antibody positive
• CD4 611, 18%
• He had 3 previous hospitalizations for pneumonia and varicella
• He began cotrimoxazole immediately. After counseling and adherence preparation he began AZT + 3TC + NVP 10 weeks ago
Case Continuation

• Mom reports that the child has taken all of his medications though they forgot one dose on Saturday
• He hasn’t had any problems
• The last week or so he’s seemed tired and not running around like usual
• He sleeps a lot but is eating well
• He hasn’t had any diarrhea or fevers
Case Continuation

• The nurse triages the child
  – The child has gained 0.5 kg since the last evaluation 3 weeks ago
  – The child appears pale and tired but is not especially ill
  – He doesn’t have a fever today
Clinical Question

• What are you concerned about?
• What should be done next?
Case Continuation

- The nurse speaks with the counselor who has been working with the family.
- He states that the family has not had much food in the house since the husband lost his job recently.
- The family also must now walk to clinic (1 hour each way) because they cannot afford a taxi.
- The family also recently expanded to include two nieces whose parents died in a car accident.
Clinical Question

• What would you do next?
Case Continuation

• The nurse sends the child to the lab to have some blood tests
• She decides to order a chest x-ray, blood chemistries, complete blood count and liver function tests
• She also decides to have the child return in 2 days when the physician will be back
• Laboratory and x-ray results should be available then as well
Case Continuation

• The mother returns with the child 2 days later to see the pediatrician
• There is little new to report. The child has remained well, but is still tired
• The exam is notable for pallor, and mild lethargy
• He is also a little irritable
• The labs:
  – CXR - normal
  – Chemistries -within normal for age
  – AST- within normal for age
  – Hg 6.2g/dL
  – WBC, platelet count - normal
Clinical Question

- What are the potential causes of this child’s anemia?
Clinical Question

• What is the most likely diagnosis?
• How would you proceed?
• Are there other lingering concerns to be addressed before the child changes treatment?
Case Continuation

• The physician believes that the anemia is most likely related to the AZT
• He makes a single drug substitution to d4T
• Mom meets with the pharmacist to review medication preparation
• She is a little worried that the child will not be able to swallow the capsules
• She learns to open them up and mix with clean water
Case Continuation

• The nurse meets with the mom to reinforce the medication changes
• She is also able to arrange for access to a local food pantry and makes arrangements for transportation for a number of follow-up visits
Case Conclusion

• The mom brings the child back 10 days later. He already appears better, more active and lively

• A repeat Hg is 7.1g/dl
Case Summary

• Vague, non-specific symptoms in children often represent medication toxicity, but can have other causes such as intercurrent illness, HIV progression, psychosocial stress, nutritional deficiency/hunger

• The multidisciplinary team can work together to assess severity and causes symptoms and to develop a care and follow-up plan
Pediatric ART: Case Studies

Baby Has Been Coughing
Chief Complaint

- A 6 month old baby girl presents to the clinic 12 days after her appointment date
- Mother complains her daughter has had a cough and diarrhea for the last 2 weeks
Clinical Question

• What would you need to know about the patient’s history?
Case Continuation

• Mother was enrolled in pMTCT program and both baby and mother took Nevirapine
• Baby was enrolled at the HIV clinic at 4 weeks and started on Cotrimazole prophylaxis
• Exclusively breastfed for 6 months
• Weaned with no breastfeeding for last 2 weeks
• Weight gain normal for first 6 months
• Adherence to care has been poor with mother missing many appointment dates
Case Continuation

- Diarrhea has been persistent with loose watery stools passed 6 times each day for the last 2 weeks
- There has been little improvement on oral rehydration therapy
- Cough has been progressive and unresponsive to Amoxicillin
- Mother also complains of fever, lethargy and poor feeding
- She denies vomiting
Case Continuation

• Mother sells vegetables at the market in town every day carrying the baby with her
• Getting meals for baby is difficult at the market
• She is married with 2 older children
• Her husband operates a bicycle taxi in town
• Mother is main breadwinner since husband spends most of his income on alcohol
• File shows 1st DNA PCR was negative
Clinical Question

• What would you do next?
Clinical Exam

• Vitals: Weight 5.4 kg (1 month ago was 6.4 kg), Temperature 37.8 C
• Some wasting present with mild dehydration
• Child irritable and listless
• Chest exam finds left sided bronchial breathing
• Rest of the exam is unremarkable
Growth Chart
Clinical Question

• How would you proceed?
Case Continuation

• Chest X-ray showed left lower lobe pneumonia.
  – Prescribed Erythromycin
• Oral rehydration therapy for diarrhea
• Cotrimoxazole prophylaxis
• Nutritional counselling and advice
• Multidisciplinary team meeting planned
• Follow up in 2 weeks
Case Continuation

• Counsellor noted mother needed to be at the market daily to sustain the family
• She was advised that she could come to the clinic early in the morning so she could still go to work
• Nutritionist advised her to continue breastfeeding and prepare tasty, tolerable and well balanced diet from food available at the market
Case Continuation

• Mother does not return till her 7 month visit
• Baby’s cough resolved, however diarrhea has persisted
• Weight has dropped to 5.2 kg despite mother following nutritional advice
• No fever or vomiting noted
• She is adherent to cotrimoxazole
• Stool studies from previous visit were normal
Clinical Question

• What would you do now?
Case Continuation

- Clinician is concerned this infant might have HIV and needs ART
- He sends DNA PCR, CD4, LFTs, CBC and chemistry
- Oral rehydration therapy for diarrhea
- He sends mother for adherence training in anticipation of starting ART at next visit
- Cotrimoxazole prophylaxis
- Nutritional counselling and advice
- Follow up in 2 weeks
Case Continuation

• At her next visit
• Her weight is unchanged (5.2Kg) and diarrhea is still present
• DNA PCR is positive, CD4 % done at 7 months of age is 20%
• Baselines tests were within normal
Clinical Question

• What ART would you start her on?
Case Conclusion

- Adherence counselling done
- She is put on
- AZT: 7ml twice a day
- 3TC: 2ml twice a day and
- NVP: 2ml once a day
- At next visit 1 week later, she has gained 0.8 kg with no new complaints
Case Summary

• Good clinical judgment is vital when interpreting virologic test if they are discrepant with the clinical picture

• HIV is rapidly progressive in infants and infants diagnosed with HIV should be started on ART

• The multidisciplinary team can work together to help improve adherence and to develop a care and follow-up plan
Pediatric ART: Case Studies

A Scared and Irritable 10-year old
Case Presentation

A 10 year old child comes to the clinic with her parents for her first follow-up visit.

– She tested HIV antibody positive one month ago and was enrolled in the clinic.
– Her mom was enrolled in the program several months ago when she was pregnant with her 2 month old brother.
– Dad is also HIV infected and, along with the baby, is followed at the clinic.
– She was ‘adopted’ when she was a baby and her mother died. But she considers these adults to be her parents.
Case Presentation

• The child was started on cotrimoxazole pending further evaluation
• The mom and child both report that she has had diarrhea for the past several months, three or four times a day
• They think she has lost weight because her clothing is hanging loosely
• She has not had any fevers, but has been tired
Case Presentation

• She is examined by the doctor
• Her vital signs are normal
• Physical exam is normal except for persistent generalized lymphadenopathy
• Her height and weight are both at the 10th percentile for her age
• CD4 212, 6%
Clinical Question

• What issues arise next in this child’s care?
Case Continuation

- She has WHO Clinical stage I
- Immunological Stage – Severe immunodeficiency
- She meets criteria for ART initiation because her CD4 is < 15%
The child’s father is also being evaluated. He is currently receiving treatment for pulmonary TB at another clinic.

On exam today he has oral thrush and appears thin. His CD4, drawn at the last visit is 62 cells/mm$^3$.

Now that he enrolled, he has access to ART. He is reluctant to start treatment because he is already taking ‘too many medicines.’

The child’s mother has less advanced disease, earlier stage of disease, WHO stage I, CD4 480 cells/mm$^3$. 
Clinical Question

• What issues does the history of tuberculosis raise for the child as well as other members of the household?
Case Continuation

- The parents think carefully, with the help of the several members of the multidisciplinary team, about disclosure.
- They are reluctant at first to speak with the child, but she begins to ask questions about coming to the clinic.
- Over the course of several weeks they decide to disclose her status.
- The parents, one nurse and a counselor who has been working closely with the family sit with the child to talk about her health.
- They tell her about the infection and that she will need medication. She learns that her parents both have HIV as well and that her Papa will also be taking the same medicine.
Clinical Question

• What is your choice of ART for this child and her father?
Case Continuation

• The child is started on:
  – AZT + 3TC + EFV
• The father is started on:
  – AZT + 3TC + EFV
• Both are started on the same day, and asked to come back in a week
Clinical Question

- How do you want to prepare the child for starting ART therapy?
Case Continuation

- Both father and daughter return next week for follow up
- Father says that his daughter is not sleeping well; seems more restless, and is now sometimes crying at night – all of which are new for her
- She also seems a little strange during the day, laughing at nothing at all and crying more easily than normal
Case Continuation

• Because she isn’t sleeping well, she is more cranky during the day
• He worries that she is troubled by her diagnosis
• Everyone in the family is still trying to cope with all the changes
Clinical Question

• What do you want to know about the daughter at this point?
Case Continuation

• Upon further questioning of the father, you find that he has not been sleeping very well either
• He is tired, and often feels dizzy, especially in the morning
• You ask him if he has been having strange dreams. He is a little frightened. He hasn’t told anyone about these dreams. Demons have been visiting him every night
• He has not missed a dose
• He makes sure his daughter takes her medications at the same time as he does
Case Continuation

- He takes medicines every day the way the nurse taught him.
- He takes the white tablet in the morning and at night and the big capsule at night.
- He makes sure his daughter takes her medications at the same time as he does.
- They have taken all the medicine and have no more at home.
Clinical Question

• What might be causing these symptoms in the child? In the father?
Case Conclusion

• You tell the patient that the problems he and his daughter are having are probably all related to efavirenz.

• You explain that this is a very common side effect.

• You tell him that this should go away after 2-4 weeks.

• The patient is reassured and agrees to continue the medications.
Case Summary

- Preparation for ART should include information about drug-related side effects.
- Efavirenz can cause CNS symptoms in adults and children. Most symptoms resolve within 2-4 weeks.
- Most patients can tolerate CNS symptoms without requiring a drug change.
- If symptoms do not resolve, another cause should be sought.
- Patient education and counseling are critical components of ART management.
Pediatric ART: Case Studies

A Red and Itchy 4-year old
Case Presentation

- A 4 year old girl is brought to the clinic for a routine follow-up
- She goes to see the nurse first, who asks her how she is doing
- She says that she is fine
- The nurse notices that she is scratching her chest
- The outreach worker is in the clinic with her today
Case Presentation

• The patient was enrolled in the clinic six weeks ago after her mom tested positive and brought her in for testing
  – CD4 percentage at enrollment – 11%

• She started on CTX as soon as her CD4 count was available

• After adherence education and counseling she began AZT+3TC+NVP 9 days ago. She started on full dose NVP; no dose escalation was done
Case Presentation

• She lives at home with her mother, father and sister

• They live an hour bus ride away from the clinic

• The mom sells candy in her neighborhood in order to earn some money, father works away from home

• Her mom has been giving her a local home remedy for the last 4 days because she has felt a little more tired lately
Clinical Question

• What else do you want to know at this point?
Case Continuation

• Mom started to notice her rash while bathing 3 days ago, and it is spreading over her body
  – It is itchy and red and looks a little swollen
  – It started on her trunk and is moving outward towards her arms

• The outreach worker noticed this rash on her arms when she came for a home visit yesterday, and encouraged the patient to come to the clinic

• Mom denies any fever, abdominal pain or diarrhea; says that she has just been a bit tired
Case Continuation

• She has never had a rash like this before

• No one else at home has this rash or is sick

• She doesn’t take any remedies other than the one for energy. It is a tea. She has taken it many times before without any problems

• She doesn’t know of any allergies to medicines or foods or other things
Case Continuation

• PE: Temp = 100.2° F (38° C); Weight = 5.4 kg; Pulse = 96 bpm
• Focal exam: Patient has a morbiliform eruption on her trunk and arms. No desquamation is observed.
• No mucosal involvement – oral or ophthalmic (genital deferred)
• No swelling around the face or lips, or in the throat
• No jaundice, lesions on palms of hands, lymphadenopathy
• Pulmonary, cardiac, and abdominal exam are unremarkable
Clinical Question

• How concerning is this rash?

• What might be causing it?

• Would any laboratory tests be useful?
Case Continuation

• Liver function tests are drawn but will not be available until the next day

• A urine dipstick is negative
Clinical Question

• How would you choose to manage this patient?

• What are the factors influencing your decision?
Case Continuation

• The nurse decides that the patient should see the physician who is not available until the late afternoon.
• Mom agrees to wait until he returns and leaves to find some lunch.
• She does not return that afternoon, as expected, but returns the next morning.
Case Continuation

• The next morning she seems less tired. She no longer has a fever and the rash has not progressed. There is a suggestion that it may be somewhat better.

• The team had planned to stop her medications, but now decide to continue her current management.

• The rash fades over the next several days and she remains adherent to her treatment.
Clinical Question

• Would you have made the same decisions?
## Learning Tool

### Rash Timeline

<table>
<thead>
<tr>
<th>Weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Usual time to rash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotrimoxazole</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 days</td>
</tr>
<tr>
<td>Nevirapine</td>
<td>*</td>
<td></td>
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<td>Anytime in first 6 weeks, but especially in first 2 weeks in scale-up</td>
</tr>
<tr>
<td>Abacavir (primary)</td>
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<td>*</td>
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<td>11 days</td>
</tr>
</tbody>
</table>
Case Summary

• Rashes in patients on ART should be taken seriously, and evaluated and managed rapidly – they may be life-threatening
• There are often overlapping toxicities of medications used for treatment and prophylaxis of HIV infection and it’s complications
• However, the differential diagnosis of a rash is broad, and should be considered systematically
• Each multidisciplinary team member should be knowledgeable about danger signs of rash, and know when to refer the patient for immediate evaluation.
Pediatric ART: Case Studies

“The Medicines Aren’t Working”
Case Presentation

• Teferi was enrolled in the clinic 7 months ago when his mother was identified as HIV-infected during antenatal care.

• He was 13 months old at the time of initial evaluation which was notable for:
  – <5% for weight, height and head circumference
  – Chronic diarrhea, recurrent thrush
  – Significant development delay – only able to sit, not crawling or using words
  – HIV antibody was positive
  – CD4 460, 11%
Case Presentation: Growth Chart

Birth- 3.2 kg, 49 cm, 25%
6 mos- 6.8 kg, 63 cm, 10% 
13 mos- 8.8 kg, 71 cm, 5%
Clinical Question

• What was the WHO Stage of Teferi at the time of initial evaluation?

• Should he have been started on CTX? ART?
Case Continuation

• In light of the clinical conditions, Teferi was started on the following medications
  – Cotrimoxazole
  – AZT + 3TC + NVP
  – MVI

• A DNA-PCR test was sent and the results were positive confirming the clinical diagnosis
Clinical Question

• How would you measure Teferi’s response to ART?
Case Continuation

• Over the last 7 months he has improved:
  – Weight has increased to 10%, height to 5%
  – Diarrhea has resolved
  – He is now walking and using many words
  – CD4 at 6 months on ART: 990, 22%
Case Continuation
Current Growth Chart

Birth: 3.2 kg, 49 cm, 25%
6 mos: 6.8 kg, 63 cm, 10%
13 mos: 8.8 kg, 71 cm, 5%
20 mos: 10.6 kg, 79 cm, 10%
Case Continuation

• Teferi continued to be seen every two months in clinic and seemed quite well
• He continued to gain weight and attain new developmental milestones
• The family was also doing well
• The new baby didn’t appear to be HIV-infected and mom has been on treatment
• Dad has finally agreed to get tested for HIV
Case Continuation

• At this visit, Teferi has been on ART for 18 months
• He has had two episodes of diarrhea and was sick with fever at home for one week
• He is now 31 months old. His growth rate has appeared to slow
• His exam is notable for new lymphadenopathy and mild thrush
Case Continuation

Current Growth Curve

Birth - 3.2 kg, 49 cm, 25%
6 mos - 6.8 kg, 63 cm, 10%
13 mos - 8.8 kg, 71 cm, 5%
20 mos - 10.6 kg, 79 cm, 10%

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Clinical Question

• What more do you want to know?
Case Continuation

- Mom reports that Teferi has not been sick, but hasn’t seemed to be quite himself
- He’s less playful and hasn’t been eating as well
- He had a fever last week
- Dad tested HIV positive and has been somewhat depressed
- He hasn’t been back for evaluation and hasn’t started any medications
- Mom reports that her son hasn’t missed any medicine
Case Continuation

- The counselor reports that the mom has started taking care of her sister who is also sick with HIV.
- The sister lives in another city and the cost of travel is a burden to the family.
- Dad is supposed to give Teferi his medication but the counselor is concerned that he may not be attentive to the task.
- The last time they picked up medication at the pharmacy they reported still having some left.
Clinical Question

• What are you concerned about?
Clinical Question

- What would you do next?
Case Continuation

• The physician decides to obtain several laboratory studies, including CD4
• He arranges to have the family meet again with the counselor to assess food availability and access to food support
• He asks that Teferi be brought back in a week
Case Continuation

• One week later:
  – No change in weight or physical exam.
  – Complete blood count – normal
  – CD4 344, 8%
  – TST – negative
  – Stool cultures pending
Clinical Question

• What is the diagnosis?

• How can you be sure?
Clinical Question

• Which factors are likely responsible for the treatment failure?

• What would you do now?
Case Conclusion

• Before changing ART, the team requests that both mom and dad return to clinic for a discussion about the child’s health and treatment.
• This time they go through intensive adherence preparation together.
• Dad begins to feel more comfortable working with his wife to take care of the family’s medical needs.
• He admits he still feels guilty about infecting his wife and child, but wants to be supportive.
Case Summary

• Teferi resumes weekly visits after initiating the new regimen
• He is less than enthusiastic about the taste of the new medicines, but is learning to tolerate it
• He begins to gain weight again and within weeks seems to be more energetic and active
• Dad is also seen in the clinic and begins ART shortly thereafter
• He takes his medicine with Teferi every day
• Both now have excellent adherence