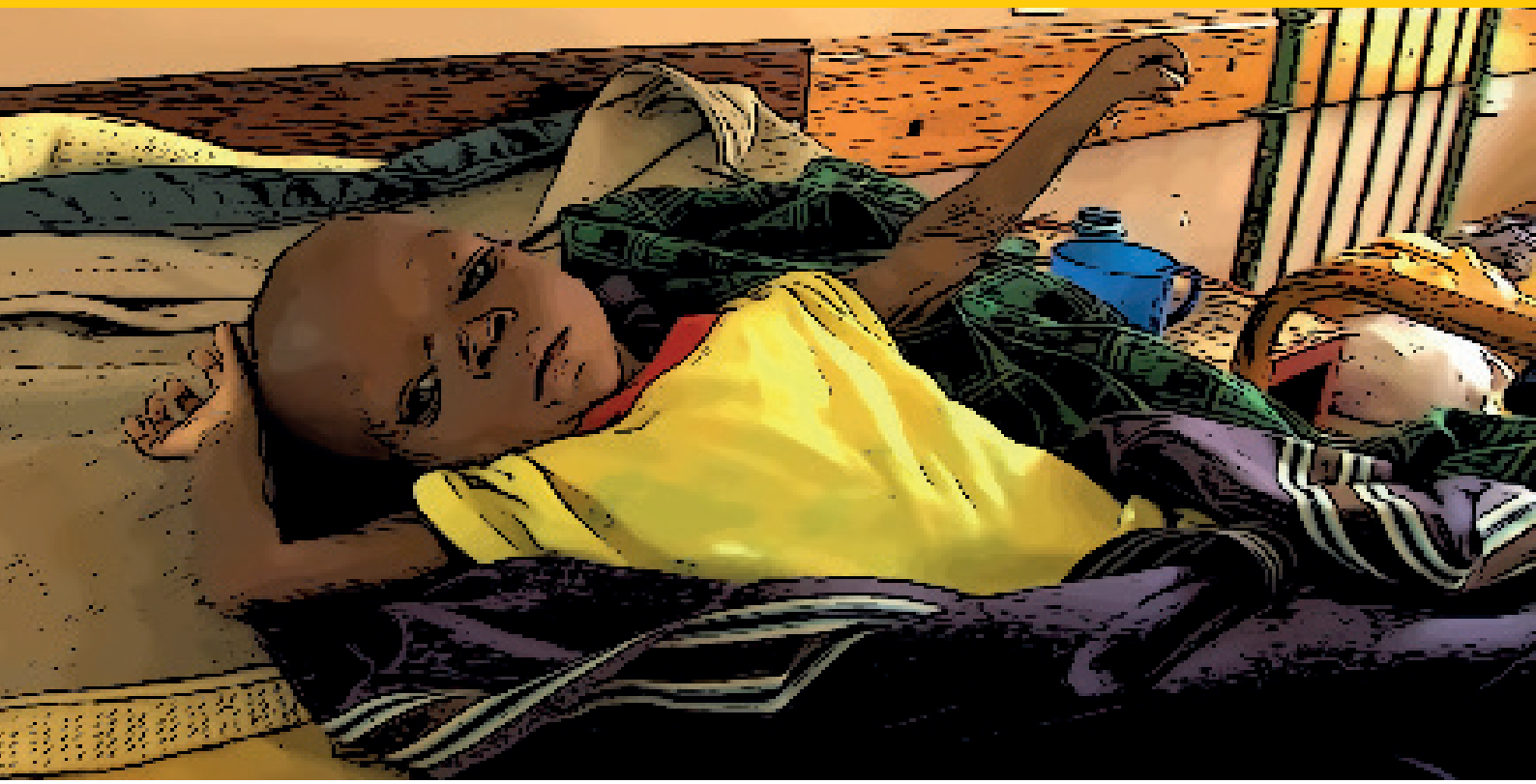
HIV Paediatric case 7 – Daniel



Daniel is 11 months old. He has been on the ward for malnourished children for the last week. He was brought into the hospital as an emergency by his mother, very sick with a high fever, diarrhoea and severe oedema. They live on an island and had to travel by boat to get to the hospital. Now, a week later, his progress is being reviewed....

HISTORY:

His mother is HIV positive. Her health record shows she tested HIV positive and was first put onto treatment when Daniel was already four months old. She says she had an HIV test during her pregnancy, which was negative. But there is no record of this. Neither is there any record of receiving treatment to prevent mother to child transmission. Daniel did not have an HIV-PCR test done at six weeks. He only had a rapid test done at six months which was negative. He is still breastfeeding.

STOP POINT

HIV HISTORY:

- **11 months ago: Daniel born. No record of PMTCT or Nevirapine prophylaxis.**
- **9 Months ago: Mother tested HIV positive when Daniel was two months old and initiated on ART because she was breastfeeding.**
- **Regimen TDF/3TC/EFV + CPT prophylaxis**
- **5 months ago: Daniel tested HIV negative with rapid test at age 6 months**

IS DANIEL INFECTED, UNINFECTED OR EXPOSED? WHY?
HOW STRONG WAS THE RISK OF INFECTION DURING BIRTH?
IS THE NEGATIVE RAPID TEST DEFINITIVE?
WHICH TEST WILL DETERMINE HIV INFECTION?

1) Exposed, because the mother is HIV positive. Because of the clinical symptoms of Daniel, we can also say that there is a strong suspicion that he is HIV infected, but this needs to be confirmed.

2) There was a very strong risk of HIV infection because his mother was not on ART when he was born. Neither is it likely that Daniel received PMTCT.

3) The negative rapid test is only an indication that he was not infected at six months. There are rare cases of children with advanced HIV disease who test HIV non-reactive to the rapid test, but who turn out to be infected when a DNA-PCR is done. The rapid test looks for antibodies, and could be negative with a baby whose immune system is not yet developed or is severely suppressed and unable to produce anti-bodies. Or they may have only been recently infected. Adults take up to three months to produce anti-bodies to HIV and may also test negative in the period immediately after infection. Daniel may also have been infected since the six month test, as he is still exposed through breast feeding. If his mother's adherence is bad he would be particularly at risk. Even if the test were positive at six months, it would also not be definitive as it may only show the anti-bodies he has received from the mother.

4) A DNA-PCR, which looks directly for the virus rather than anti-bodies, would confirm whether he is infected. Early infant diagnosis (EID) is indicated because he is unwell and below age 12 months; if he is found to be HIV positive, rapid testing needs to be done to confirm HIV infection at 12 and 24 months (+ 6 weeks after stopping breastfeeding).

Daniel has been weighed and had his height measured at regular intervals since his birth. But the growth chart in his health passport has not been filled out.
This is what it would look like.
He grew well in the first seven months and had a healthy weight. Then he started getting coughs and fevers noted in his health passport. He lost two and a half kilos, some 30% of his body weight, in four months. This was what he weighed when he came to the hospital.....

STOP POINT

ON ADMISSION A WEEK AGO:
- **Temperature: 39**
- **Respiratory rate: 70**
- **Heart Rate: 123**
- **Sunken fontanelle**
- **Diarrhoea**
- **Malaria: +ve**
- **HB: 4.2 g/dl**
- **HIV rapid test: -ve**
- **Weight: 5.3 kg, Height: 67cm. MUAC (upper arm measurment): 10cm**
- **Oedema +++**

TREATMENT GIVEN:
Antibiotics, quinine, feeding program, blood transfusion.

WHAT CONCLUSIONS CAN YOU DRAW FROM THE GROWTH CHART?

He has good progress for seven months. Then a sharp decline. This is almost certainly the result of severe infection/illness.
Weight loss could have been triggered by on-going diarrhea or infection? TB? Advanced HIV infection?

On admission to hospital a week ago, Daniel had a high fever and respiratory distress. He tested positive for malaria. He was acutely anaemic with an Hb of 4.2. He had severe Oedema and acute malnutrition. He was treated with anti-malarials, antibiotics and a blood transfusion. He was also started on a feeding program on the ward for malnourished children. An HIV rapid test was done, which once again came back as negative.

STOP POINT

IS THE NEGATIVE HIV RAPID TEST RESULT DEFINITIVE?
WHAT ELSE COULD YOU DO TO CONFIRM HIV STATUS?

- It is still only an indication as he has been continually exposed to the virus. This child, as previously stated, had a high risk of becoming infected because the mother did not receive any ARVs during pregnancy or labor and also now presents with symptoms of advanced HIV infection. Therefore another diagnostic test should be done.
- A DNA-PCR should give a definitive answer. While waiting for the DNA-PCR result there is a strong argument for starting ART as the benefits if he is infected would out-weight the risks if he is not. (However (Malawi) guidelines for early infant diagnosis (EID) say ART can be started only when there are symptoms of advance HIV disease combined with a positive rapid test.)

STOP POINT

PHYSICAL EXAMINATION - A WEEK AFTER ADMISSION:

WHAT WOULD YOU WANT TO LOOK FOR IN AN EXAMINATION?
WHAT QUESTIONS WOULD YOU WANT TO ASK?
WHAT FURTHER TESTS WOULD YOU ORDER?

1) Look for any other signs of HIV infection – typical opportunistic infections, particularly oral candidiasis, PCP, otitis, PPE. Check oedema and nutrition again – to see if there has been any improvement.

2) Cough (is the cough productive? how long has it been going on for?), fevers, night sweats. How long have they been going on for.

3) TB needs to be ruled out. Investigate the mother as well. Sputum test and x-ray for mother and x-ray baby if possible.

After 7 days on a feeding program, Daniel's oedema has now disappeared. He looks severely wasted. His breathing looks difficult. Crepitations on both sides of the lung are clearly audible through a stethoscope. The fever is reduced, but it has not gone away. There is still a slightly sunken fontanelle, although this is hard to see below his hair. There are white sores in his mouth. He has fluid coming out of his ears. His conjunctiva are very pale. So are his palms.

The nutritional assessment is also slightly worse than a week ago. His weight has gone down and his upper arm measurement is almost a centimeter less.

STOP POINT

RESULTS OF EXAMINATION:

- **Severe lung condition and cough, persists despite treatment on antibiotics.**
- **Temperature: 37.8**
- **Oral candidiasis. Otitis. Sunken fontanelle**
- **Weight: 5.2 kg (week ago 5.3),**
- **MUAC: 9.1 cm (week ago 10cm)**
- **Oedema: 0 (1 week ago +++)**
- **Hb: 8.3g/dl after blood transfusion --- (4.2g/dl a week ago)**

WHAT CONCLUSIONS WOULD YOU DRAW FROM THE EXAMINATION?

He has SAM – Severe Acute malnutrition, because he looks severely wasted and the MUAC is below 11.5 cm. On admission he had oedema: so he had Kwashiorkor. Now, the oedema has disappeared: he has Marasmus

WHAT TREATMENT PLAN WOULD YOU SUGGEST?

Continue breastfeeding + feeding program (=Complementary feeding) + iron for his Anemia.
Hb needs to be done again to check for anemia.
He needs antibiotics for the ear infection and the cough.
Nystatin for the oral candidiasis.
He must be checked for TB as he has a cough and wasting.
X-ray and sputum test if possible.
DNA/PCR needs to be done to test for HIV.

Daniel is not able to sit and stand. He is close to 1 year old, but his development shows the ability of a 4 months old baby. He is clearly interested in the ball and wants to reach out, but he cannot do it. There is no sign of any disability. His joints are working and have full flexibility. It is just that his muscles are so wasted through illness and malnutrition that they are too weak to support him.

TWO DAYS LATER:

Two days later Daniel is free of fever and diarrhoea. The oral candida and the otitis are improving. But there has not been a significant change in his breathing and cough. The mother asks if she can now be discharged and go home.

STOP POINT

SHOULD THEY BE SENT HOME NOW?

No. TB has not yet been ruled out yet.

It is decided that Daniel needs to stay in hospital. TB needs to be ruled out as there is a history of frequent coughing. He has all the clinical signs of severe HIV disease, but has tested non-reactive. A DNA-PCR test is available, so this is done and sent off to the lab. It is unclear how long the results will take to arrive. In the meantime he is not started on ART.

STOP POINT

WOULD YOU HAVE STARTED ART?
WHAT WOULD BE THE BALANCE OF POTENTIAL RISKS AND BENEFITS?

Because of the advanced malnutrition with recurrent bacterial infections, persistent pneumonia and oral candidiasis in an HIV exposed child, a diagnosis of presumed severe HIV infection could be made (although to fit the WHO definition there should also be a positive anti-body test.) Therefore ART could be started pending a definitive result from a DNA/PCR.

The potential benefits of starting ART are that it could lead to a recovery of his immune system, and therefore a decreased risk of severe infections. If Daniel is HIV positive - and ART is not started very soon - then he will almost certainly die. So this is an urgent decision.
The potential risks of starting ART are the possibility of side effects from the ARVs or (if he is positive) an immune response which he does not survive.
The potential benefits of ART if he is positive far outweigh the risks.

A chest x-ray was done.

STOP POINT

WHAT WOULD YOU DO NOW?

Check the mother as well. If she has signs of TB then Daniel has been exposed and is very likely to be infected. Start TB treatment.

Daniel is started on TB treatment. His mother's sputum test is negative for TB but she has been coughing for a long time and has a recorded weight loss of 17 kgs in the last 16 months. This is her X-Ray
Daniel's mother is also started on TB treatment. She is told that the whole family need to be checked for TB. She has five other children, all of whom she says are HIV negative. Two other children have died.

3 WEEKS AFTER ADMISSION

Daniel has improved in some areas. The fevers, diarrhoea, otitis and thrush have gone. But he is still coughing and there is only modest weight gain despite an intensive feeding program.

STOP POINT

Weight on admission: 5.3 KG. Weight three weeks later: 5.5 kg
WOULD YOU CONSIDER THIS TO BE ADEQUATE WEIGHT GAIN?

No. He is clearly failing to thrive.

The mother is asked to give TB medication to Daniel in the presence of a nurse to make sure that he is getting the medicines properly.

4 WEEKS AFTER ADMISSION

Now Daniel seems to be more active and has started taking an interest in the people surrounding him. But the oral thrush has recurred. And his weight has still not improved very much. Meanwhile the DNA-PCR test has been lost at the laboratory.

STOP POINT

WHAT WOULD YOU DO NOW?

There is a very strong argument to be made for starting ART now. Daniel has symptoms of severe HIV infection. Other infections have been treated, like otitis, candidiasis and TB. Despite this treatment for opportunistic infections, Daniel is still not improving. In which case he should be initiated on ART. Another DNA/PCR test could also be done. But ART should be started straight away, pending the outcome of the test.

OUTCOME:

Mother discharged herself 33 days after admission. She did not return for follow up.
Daniel died three months later.
Seven months later Daniel's mother died.

LEARNING POINTS:

- In a severely malnourished child, it is a MUST to investigate for HIV infection, as well as rule out other possible diseases like TB.
- If, as in this case, there is a strong suspicion of HIV infection, an HIV DNA PCR should be done as soon as possible, if available in the emergency room or on the first day at the ward.
- Where there is a strong suspicion of HIV infection, ART should be started as soon as the DNA-PCRP sample has been taken. The potential benefits outweigh any risks associated with side effects of ART.