CASE REPORT

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Advanced infant HIV infection with Cytomegalovirus coinfection following interruption of maternal antiretroviral therapy: a case report

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ABSTRACT

Background: Despite major global progress in the prevention of mother-to-child transmission (PMTCT), vertical HIV transmission continues to occur, particularly in settings where continuity of maternal care and viral suppression are not maintained. Infants infected perinatally remain at high risk for rapid disease progression, severe immunosuppression, and early mortality, especially in the absence of timely diagnosis and antiretroviral therapy (ART). Coinfections such as cytomegalovirus (CMV) may further complicate the clinical course and influence management decisions.

Case Presentation: We report a case of a 7-week-old female infant presenting with chronic diarrhea, fever, severe malnutrition, jaundice, and pancytopenia. The infant was born at term via elective cesarean section to a mother with known HIV infection who had discontinued ART prior to and during pregnancy. Neonatal prophylaxis consisted of zidovudine monotherapy based on reported maternal adherence. Early Infant Diagnosis confirmed HIV-1 infection with profound immunosuppression (CD4 37 cells/µL, 2.6%) and a high viral load (2.99×10^6 copies/mL). Further evaluation revealed active CMV infection with significant hepatobiliary involvement. Management included supportive stabilization, treatment of CMV infection, opportunistic infection prophylaxis, and carefully timed ART initiation in the context of severe hepatic dysfunction and risk of immune reconstitution inflammatory syndrome.

Conclusion: This case highlights how disruption along the PMTCT cascade, including interruption of maternal ART and misclassification of neonatal transmission risk, can lead to advanced HIV disease in early infancy despite obstetric preventive measures. Sustained maternal viral suppression, accurate perinatal risk assessment, and timely initiation of ART remain critical to preventing severe pediatrics HIV.

Keywords: HIV, Mother-To-Child Transmission, Cytomegalovirus, Immune Reconstitution Inflammatory Syndrome.
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INTRODUCTION

Human Immunodeficiency Virus (HIV) infection remains a major cause of morbidity and mortality among women of reproductive age, including pregnant women. It contributes significantly to infant and child mortality through mother-to-child transmission. Despite the widespread availability of antiretroviral therapy (ART), an estimated 570,000 people were living with HIV in Indonesia in 2023, including approximately 180,000 women and 17,000 children under 14 years of age.[1] Vertical transmission of HIV is defined as transmission from an infected mother to her child during pregnancy, delivery, or the postpartum period, including through breastfeeding. Most infants with HIV infection are asymptomatic at birth; however, clinical manifestations typically develop within the first few months of life.[2]

Prevention programs have been developed to reduce new HIV infections resulting from vertical transmission and to support the goal of an HIV-free generation. Over the past two decades, prevention of mother-to-child transmission (PMTCT) programs have been shown to significantly decrease the number of infants infected with HIV born to mothers living with HIV. Current PMTCT recommendations include routine prenatal HIV testing and counseling, prompt initiation of antiretroviral therapy (ART) in pregnant women diagnosed with HIV, continuation of ART during pregnancy, delivery, and breastfeeding, appropriate obstetric management based on clinical conditions, and neonatal antiretroviral prophylaxis initiated immediately after birth until Early Infant Diagnosis (EID) testing is performed. When effectively implemented, PMTCT interventions can reduce the risk of vertical HIV transmission from 15–45% to less than 1%.[3,4]

Despite the progress achieved through PMTCT programs, the number of children living with HIV remains substantial. In 2024, an estimated 120,000 new HIV infections occurred globally among children under five years of age. In Indonesia, as of June 2025, approximately 10,533 children were living with HIV. These figures indicate that although PMTCT is highly effective

when properly implemented, significant gaps persist in real-world settings. Such challenges include delayed antenatal care (ANC) attendance, poor adherence to antiretroviral therapy, and concerns regarding potential drug toxicity in infants, all of which may contribute to increased infant morbidity and mortality.[5,6]

This case report describes an infant with advanced HIV infection despite partial implementation of PMTCT measures. The case highlights how interruption of maternal antiretroviral therapy and suboptimal neonatal prophylaxis may result in early severe HIV disease. Concomitant cytomegalovirus (CMV) infection further complicated the clinical course, contributing to cholestasis and challenges in timing antiretroviral therapy initiation. This report underscores the importance of continuous maternal treatment adherence and comprehensive perinatal care to prevent severe early infant HIV disease.

CASE PRESENTATION

A seven-week-old female infant was brought to the emergency department with a five-day history of fever, predominantly at night, accompanied by watery diarrhea occurring six to seven times per day. According to her parents, the diarrhea had been present since one week of age but was initially considered normal. Since birth, the infant had been exclusively formula-fed and had not received breast milk.

At one month of age, the parents noted inadequate weight gain with persistently frequent loose stools. The patient was evaluated at a primary healthcare facility, where cow's milk protein allergy was suspected, and the formula was changed to a partially hydrolyzed formula. However, no significant clinical improvement was observed following this intervention.

The infant was born at 39 weeks and 6 days of gestation via elective cesarean section with a birth weight of 3000 g to a 27-year-old G2P1001 mother living with HIV. The mother had been diagnosed with HIV in October 2021 and was initially treated with a combination antiretroviral regimen consisting of tenofovir, lamivudine, and dolutegravir (TLD). She first became aware of her HIV status during her previous pregnancy. Her first child had received neonatal antiretroviral prophylaxis but later developed diarrhea and lethargy and died at 2.5 months of age in January 2022.



Figure 1. Clinical condition of the patient. (A) at initial hospital admission; (B) & (C) icteric sclera and pale stool observed at follow-up visit

Following this event, the mother discontinued antiretroviral therapy in February 2022. In April 2025, she discovered she was approximately three months pregnant. During antenatal care visits, she reported continued ART use; however, she had in fact discontinued therapy due to concerns regarding potential fetal toxicity. Antiretroviral therapy was restarted only after delivery. Throughout the pregnancy, no CD4 count or viral load monitoring was performed, and she did not receive formal antenatal HIV counseling. Screening for other infections, including hepatitis B, hepatitis C, and syphilis, was negative.

After birth, the infant received oral zidovudine prophylaxis at a dose of 12 mg every 12 hours, along with standard newborn care, including hepatitis B vaccination and intramuscular vitamin K administration. No additional antiretroviral agents were initiated, as maternal ART adherence during pregnancy was reported to be adequate at the time of delivery. At five weeks of age, zidovudine prophylaxis was discontinued by the parents without medical consultation.

On initial examination, the infant appeared lethargic and icteric but was alert, with adequate urine output. Anthropometric measurements revealed a weight of 3.2 kg and a length of 54 cm. According to WHO growth standards, the weight-for-age Z-score was −3.12 SD, length-for-age −1.09 SD, and weight-for-length −3.37 SD, consistent with severe underweight and acute malnutrition (**Figure 1A**).

Vital signs showed a temperature of 37.8°C, heart rate of 138 beats per minute, respiratory rate of 62 breaths per minute,

and oxygen saturation of 97% on 1 L/min via nasal cannula. Physical examination revealed pale conjunctiva and mild jaundice without signs of dehydration or edema. No oral thrush was observed. Lung auscultation demonstrated normal vesicular breath sounds without adventitious sounds. Abdominal examination revealed a soft, non-tender abdomen with normal bowel sounds and no hepatosplenomegaly.

Laboratory evaluation on the first day of admission revealed pancytopenia, with hemoglobin 6.2 g/dL, leukocyte count 5.16 $\times 10^3$/µL, and platelet count 102 $\times 10^3$/µL. C-reactive protein was elevated at 99 mg/L. Stool examination showed yellow-green mucus with 6–8 leukocytes per high-power field, and fecal occult blood testing was negative.

Peripheral blood smear demonstrated normochromic erythrocytes with marked anisopoikilocytosis, including normocytic and microcytic cells, ovalocytes, pencil cells, target cells, teardrop cells, and helmet cells. Polychromasia and nucleated red blood cells were present. Leukocytes were reduced in number and predominantly composed of mature lymphocytes, with occasional atypical lymphocytes. Immature granulocytes, including myelocytes, metamyelocytes, and band neutrophils, were observed, with no blast cells identified. Platelets were decreased in number, with the presence of giant platelets and no evidence of platelet clumping.

Overall findings were consistent with pancytopenia. Differential considerations included iron deficiency anemia with acute blood loss and viral infection. Reticulocyte analysis showed an elevated reticulocyte percentage of 2.85%, with an absolute count of 0.066 $\times 10^6$/µL, suggesting an active bone marrow response to anemia.

Intravenous fluids were administered to maintain hydration during hospitalization. Empirical intravenous cefotaxime at a dose of 100 mg three times daily was initiated on the first day of admission and continued for seven days to cover possible bacterial infection. Neonatal antiretroviral prophylaxis was transitioned to oral cotrimoxazole at a dose of 15 mg (2 mL) once daily.

Due to severe anemia (hemoglobin 5.6 g/dL), the patient received two packed red blood cell (PRBC) transfusions of 50 mL each on hospital days three and four. Additional supportive therapy included oral paracetamol drops (0.4 mL every 4–6 hours as needed for fever) and oral zinc supplementation at 10 mg per day to support intestinal mucosal recovery and immune function.

Post-transfusion laboratory evaluation demonstrated hematologic improvement, with leukocyte count 7.17 $\times 10^3$/µL, hemoglobin 9.7 g/dL, hematocrit 28.8%, platelet count 110 $\times 10^3$/µL, and C-reactive protein <5 mg/L. These findings were consistent with improvement in cytopenia and reduction of inflammatory markers.

During hospitalization, the patient's clinical condition gradually improved, as evidenced by the resolution of fever, decreased frequency of diarrhea, and improved tolerance to formula feeding.

An Early Infant Diagnosis (EID) sample was obtained during hospitalization. The result, confirming HIV-1 infection, was received approximately ten days after discharge. At follow-up in the pediatrics outpatient clinic, clinical reassessment and baseline laboratory investigations were performed in preparation for antiretroviral therapy (ART) initiation. At that visit, the infant appeared jaundiced, with icteric sclera and pale stools (Figure 1B-C). Tuberculin skin testing was negative. Laboratory evaluation revealed recurrent pancytopenia, markedly elevated liver transaminases, severe immunosuppression based on CD4 count, and a high HIV viral load (Table 1).

Table 1. Laboratory findings at follow-up evaluation

Parameter	Results	Reference Range	Interpretation
Hemoglobin (g/dL)	8.0	11–15	Decreased
Hematocrit (%)	25	32–46	Decreased
Leukocyte count (WBC) (10^3/µL)	4.82	6.0–17.0	Decreased
Platelet count (PLT) (10^3/µL)	87	150–400	Decreased
AST (SGOT) (U/L)	4182	0-37	Markedly elevated
ALT (SGPT) (U/L)	2471	0-42	Markedly elevated
Urea (mg/dL)	16	10-50	Within normal limits
Creatinine (mg/dL)	0.2	0.3–1.2	Slightly decreased
CD4 count (cell/µL) (%)	37 (2.6)	1600-4000	Severely decreased
CD8 count (cell/µL) (%)	935 (65%)	560–1700	Within normal range
CD4/CD8 ratio	0.04	0.69 - 2.83	Severely decreased
Tuberculin skin test	Negative	Negative	–
HIV-1 RNA (10^6 copies/mL)	2.99 (log 6.48)	Undetectable	Very high

The patient was subsequently referred to a tertiary referral center for further evaluation and management. At the referral hospital, investigations were undertaken to assess for opportunistic infections and other potential causes of hepatobiliary dysfunction.

Repeat laboratory studies demonstrated persistent anemia and thrombocytopenia, along with hyperbilirubinemia predominantly involving direct (conjugated) bilirubin. Liver function tests showed markedly elevated transaminases with both hepatocellular and cholestatic patterns. Evidence of impaired hepatic synthetic function was noted, as indicated by prolonged prothrombin time and an elevated international normalized ratio (INR).

Abdominal ultrasonography was performed in both fasting and postprandial phases and did not demonstrate findings suggestive of biliary atresia (Figure 2). Serologic testing revealed reactive cytomegalovirus (CMV) IgM and IgG antibodies. Real-time polymerase chain reaction (PCR) testing for CMV from a urine sample was positive, confirming active CMV infection. Urine culture showed no significant bacterial growth. PCR testing for *Pneumocystis jirovecii*

Table 2. Follow-up laboratory findings at the tertiary referral center

Parameter	Result	Reference Range	Interpretation
Leukocyte count (WBC) (10^3/μL)	7.76	6.0–14.0	Within normal range
Hemoglobin (g/dL)	8.3	12.0–16.0	Decreased
Hematocrit (%)	27.9	36.0–49.0	Decreased
Platelet count (10^3/μL)	34	140–440	Markedly decreased
Total bilirubin (mg/dL)	7.90	0.2–1.2	Elevated
Direct bilirubin (mg/dL)	5.88	0–0.5	Markedly elevated
Indirect bilirubin (mg/dL)	2.02	0.2–0.7	Elevated
AST (U/L)	595	<34	Markedly elevated
ALT (U/L)	516	<55	Markedly elevated
Alkaline phosphatase (ALP) (U/L)	309	Age-adjusted	Elevated
Gamma-glutamyl transferase (GGT) (U/L)	142	<33	Markedly elevated
Albumin (g/dL)	2.20	3.5–5.2	Decreased
Prothrombin time (PT) (Seconds)	20.5	10.8–14.4	Prolonged
INR	1.54	0.9–1.1	Elevated
Activated partial thromboplastin time (aPTT) (Seconds)	30.5	24–36	Within normal range
Procalcitonin (ng/mL)	2.98	<0.05	Elevated
HBsAg	Non-reactive	Non-reactive	–
Anti-HCV	Non-reactive	Non-reactive	–
CMV IgM (AU/mL)	Reactive (13.49)	Non-reactive <0.85	Reactive
CMV IgG (AU/mL)	Reactive (146.7)	Non-reactive <6.0	Reactive
CMV PCR (urine)	Positive	Negative	Positive
Pneumocystis jirovecii PCR	Negative	Negative	–
Urine culture	Mixed bacterial flora	Not significant	Not clinically significant
Rubella IgG	1.80	Reactive ≥1.6	Reactive
Rubella IgM	0.86	Negative <1.0	Negative
Toxoplasma IgM	0.25	Negative <0.83	Negative
Toxoplasma IgG	0.40	Negative <1.6	Negative

from sputum was negative (Table 2), and chest radiography did not demonstrate findings suggestive of tuberculosis.

During hospitalization at the tertiary referral center, the patient received supportive care and prophylactic therapy according to clinical status and ongoing evaluation. Opportunistic infection prophylaxis with oral cotrimoxazole was administered at a trimethoprim dose of 4 mg/kg/day. Oral fluconazole was initiated at 6–12 mg/kg/day.

Given the presence of hepatobiliary involvement with cholestasis, the patient was managed by the Gastrohepatology Division and received oral ursodeoxycholic acid at 10–15 mg/kg per dose every 8 hours. Vitamin supplementation included oral vitamins A and D, vitamin E at 15–25 IU/kg/day, and intramuscular vitamin K at 0.3 mg/kg, planned for repeated administration every 21 days.

Confirmed CMV infection was treated with oral valganciclovir for six months under the supervision of the Infectious Disease team. Antiviral therapy was initiated to address active CMV infection prior to the planned initiation of definitive antiretroviral therapy (ART), with timing of ART carefully considered in the context of severe hepatic involvement and the potential risk of immune reconstitution inflammatory syndrome (IRIS).

DISCUSSION

In this case, the infant presented with chronic diarrhea, fever, severe malnutrition, jaundice, and pancytopenia. Routine stool examination did not reveal evidence of acute infection or gastrointestinal bleeding, while peripheral blood smear findings raised suspicion of viral infection. A maternal history of HIV infection with poor adherence to antiretroviral therapy, combined with interruption of neonatal zidovudine prophylaxis, increased suspicion of vertical HIV transmission. Early Infant Diagnosis subsequently confirmed HIV-1 infection, with profound immunosuppression reflected by a markedly reduced CD4 count and a very high viral load.

These findings are consistent with previous reports indicating that pediatrics HIV infection often presents with nonspecific manifestations involving multiple organ systems, including recurrent infections, chronic diarrhea, failure to thrive, and hematologic abnormalities such as thrombocytopenia or pancytopenia.[7]

The presence of early-onset chronic diarrhea accompanied by severe malnutrition suggests persistent HIV replication within gut-associated lymphoid tissue, leading to mucosal barrier disruption, nutrient malabsorption, and increased microbial translocation. These mechanisms may further exacerbate nutritional deterioration and immune dysfunction. This process is likely amplified by delayed initiation of antiretroviral therapy and profound immunosuppression, as reflected by the markedly reduced CD4 count.[8] Pancytopenia has also been reported as a common hematologic manifestation in advanced HIV infection and may serve as an indicator of disease severity.[9]

According to the 2021 WHO guidelines, all children under five years of age diagnosed with HIV are classified as

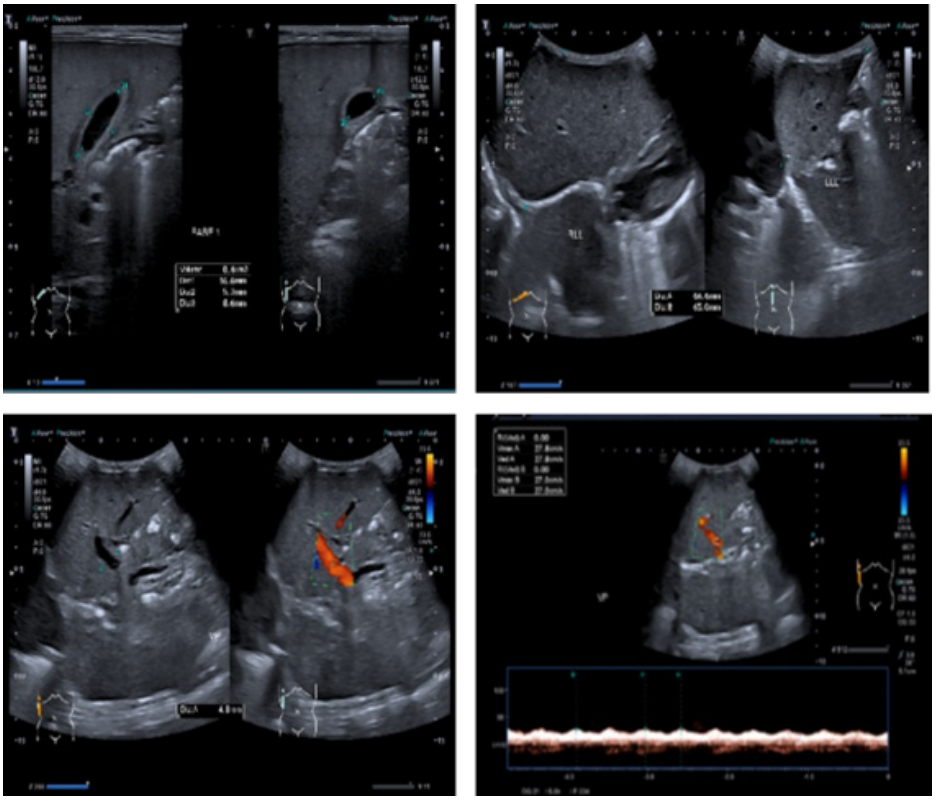


Figure 2. Two-phase abdominal ultrasonography findings

having advanced HIV disease, regardless of CD4 count or clinical staging. This classification reflects the high risk of rapid disease progression and severe complications in this age group, as illustrated in the present case.[10]

Mother-to-child transmission (MTCT) of HIV may occur in utero, intrapartum, or postnatally through breastfeeding. In the absence of intervention, the risk of transmission ranges from 25–42%. However, with optimal implementation of prevention of mother-to-child transmission (PMTCT) strategies, this risk can be reduced to below 1%.[11-13]

The success of PMTCT is highly dependent on early diagnosis and sustained adherence to antiretroviral therapy during pregnancy. However, psychosocial factors such as stigma, denial, and difficulty accepting an HIV diagnosis remain significant barriers, particularly among women newly diagnosed during pregnancy. These challenges increase the risk of treatment interruption and failure to achieve viral suppression.[12] Elevated maternal viral load prior to or during pregnancy has consistently been associated with an increased risk of vertical transmission, both in utero and intrapartum.[14] A cohort study from Tanzania reported that mothers with a viral load ≥50,000 copies/mL at delivery had a fourfold higher risk of early infant transmission.[15]

In the present case, the mother had been diagnosed with HIV during her first pregnancy but discontinued antiretroviral therapy due to psychosocial factors and stigma. She was subsequently lost to follow-up prior to her next pregnancy. The pregnancy was recognized at approximately four months of gestation, and no preconception counseling or viral load assessment was performed. Although HIV status was known, ART was not resumed during pregnancy due to concerns regarding potential fetal toxicity. The absence of documented viral suppression before and throughout pregnancy, together with suboptimal neonatal prophylaxis, likely increased the risk of vertical HIV transmission in this case.

The infant was born at 39 weeks and 6 days of gestation via elective cesarean section. The amniotic fluid was meconium-stained, and there was no prolonged rupture of membranes. The birth weight was 3000 g, with Apgar scores of 7, 8, 9, 9. Elective cesarean delivery in the absence of prolonged membrane rupture is considered an obstetric strategy to reduce intrapartum HIV exposure. It may theoretically lower the risk of mother-to-child transmission. Prospective cohort studies have demonstrated that elective cesarean section is associated with a lower transmission risk compared with emergency cesarean delivery or vaginal birth, particularly in the setting of unsuppressed maternal viral load.[16-18] In addition, breastfeeding was avoided as part of efforts to prevent postnatal HIV transmission. The infant received immediate zidovudine prophylaxis after birth and was fed standard formula.

At the time of delivery, neonatal HIV transmission risk was assessed based on maternal history obtained during admission, in which the mother reported ongoing adherence to antiretroviral therapy. No objective verification of maternal viral load or treatment continuity was available, as viral load monitoring had not been performed during pregnancy. Based on this information, the infant was classified as low risk for vertical transmission, and the decision to administer zidovudine monotherapy was made by the attending obstetric and neonatal care team at the delivery facility. However, subsequent clarification revealed that the mother had discontinued ART during pregnancy, which would have placed the infant in a high-risk category according to current PMTCT recommendations. Under these circumstances, enhanced combination prophylaxis would have been indicated. Consequently, the infant received zidovudine monotherapy rather than combination prophylaxis.

A case report from Poland demonstrated that even infants born to mothers diagnosed postpartum could avoid HIV infection despite brief breastfeeding exposure when timely and adequate combination antiretroviral prophylaxis was administered.[19] This finding is consistent with the Indonesian National HIV Guidelines (2019), which recommend triple antiretroviral prophylaxis zidovudine (ZDV), lamivudine (3TC), and nevirapine (NVP)

within the first 6–12 hours of life for infants considered at high risk of transmission.[20]

Management in this case focused on clinical stabilization, prevention of opportunistic infections, and preparation for long-term antiretroviral therapy (ART) initiation. Empirical intravenous cefotaxime was administered to cover potential secondary bacterial infection in the setting of severe immunosuppression. This approach is consistent with clinical guidelines recommending broad-spectrum antibiotic therapy in patients with advanced HIV who present with acute infection or systemic inflammatory signs while awaiting definitive etiologic evaluation.[10,11]

The patient received two packed red blood cell (PRBC) transfusions to manage severe anemia (hemoglobin 5.6 g/dL), along with supportive therapy including paracetamol and zinc supplementation to support general condition and gastrointestinal mucosal recovery.

As part of opportunistic infection prevention, low-dose cotrimoxazole prophylaxis was initiated. According to the WHO (2021) and the National Institutes of Health (2023) guidelines, infants with HIV exposure or confirmed infection are recommended to receive cotrimoxazole prophylaxis starting at 4–6 weeks of age or immediately after HIV diagnosis to prevent severe opportunistic infections such as Pneumocystis jirovecii pneumonia and invasive bacterial infections.[10,11] In this case, cotrimoxazole was initiated prior to receipt of the positive HIV result as continuation of postnatal prophylactic care following zidovudine administration.

Following confirmation of HIV-1 infection by Early Infant Diagnosis (EID), further investigations were undertaken to guide antiretroviral therapy (ART) initiation. These evaluations aimed to determine disease stage, identify opportunistic infections, select an appropriate ART regimen, and establish baseline parameters for monitoring treatment response and potential adverse effects.[11]

Robust evidence supports early initiation of ART in infants with HIV. The Children with HIV Early Antiretroviral Therapy (CHER) trial conducted in South Africa demonstrated that immediate ART initiation in infants aged 6–12 weeks reduced early mortality by up to 75% compared with deferred treatment, even among those with preserved CD4 percentages (>25%). Furthermore, observational studies from the United States, Europe, and South Africa have consistently shown that earlier ART initiation is associated with reduced progression to AIDS or death and improved growth outcomes. However, international guidelines also emphasize that in ART-naive children presenting with severe illness or active opportunistic infections, management of the acute condition should be prioritized before initiating ART, given the potential risk of immune reconstitution inflammatory syndrome (IRIS).[21]

After referral to the tertiary care Centre, the patient underwent further evaluation for opportunistic infections, including microbiologic and virologic investigations. During this period, additional supportive management was provided. Hepatobiliary therapy with ursodeoxycholic acid was initiated in response to cholestasis and impaired liver function. Supplementation with vitamins A, D, E, and K was administered to address fat-soluble vitamin deficiency associated with cholestasis. Cotrimoxazole prophylaxis was continued, and systemic antifungal therapy with fluconazole was initiated as part of opportunistic infection prevention and management. Based on the extended evaluation, active opportunistic infection, particularly cytomegalovirus (CMV), was suspected and subsequently supported by clinical findings of cholestasis, including icteric sclera and pale stools, markedly elevated liver enzymes, abdominal ultrasonography findings, and positive CMV PCR from urine.

Differentiating the relative contribution of advanced HIV infection and active cytomegalovirus (CMV) disease in this case was based on an integrated clinical and virological assessment. Both conditions may cause transaminase elevation, cholestasis, and cytopenia; however, several findings suggested a substantial contribution from CMV. The degree of aminotransferase elevation, together with conjugated hyperbilirubinemia, pale stools, and clinical jaundice, was more pronounced than typically described in HIV infection alone, where liver involvement is often multifactorial. In addition, evidence from pediatric cohorts indicates that clinically significant liver disease in HIV is more frequently associated with coinfections rather than HIV in isolation, supporting the likelihood of an additional infectious driver. The detection of CMV-DNA in urine by PCR provided virological evidence of CMV replication. Although PCR positivity alone does not establish end-organ disease, its presence in a severely immunocompromised host increased the clinical relevance of CMV as a contributor.[22,23]

The attribution of hepatobiliary involvement to CMV was therefore supported by the convergence of multiple objective findings: (1) marked liver enzyme elevation with conjugated hyperbilirubinemia and clinical features of cholestasis; (2) positive CMV-DNA PCR indicating active viral replication; (3) hematological abnormalities, including pancytopenia, which have been reported in CMV infection[24]; and (4) the absence of alternative infectious etiologies based on clinical evaluation. Abdominal ultrasonography demonstrating hepatobiliary abnormalities consistent with a cholestatic process further supported this interpretation. Taken together, these findings suggest that CMV was a significant contributing factor to the observed hepatobiliary and systemic manifestations, while acknowledging that overlapping effects of advanced HIV infection cannot be completely excluded. Alternative infectious etiologies were systematically considered and not supported by available clinical and microbiological evaluation. Bacterial sepsis was treated empirically, but did not account for the cholestatic pattern or CMV PCR positivity. Hepatitis B and C coinfection, recognized causes of liver disease in HIV-infected children, were evaluated as part of baseline workup and were not identified as contributing factors in this case.

Current clinical guidance suggests that in ART-naive patients with severe opportunistic infections involving significant organ dysfunction, initiation

of ART should be carefully timed due to the risk of immune reconstitution inflammatory syndrome (IRIS), including CMV-associated IRIS, which may result in clinical deterioration. Some studies have reported that short deferral of ART in the setting of active CMV infection may reduce the incidence or severity of IRIS compared with immediate initiation.[25] In this case, management was initially directed toward treatment of active CMV infection and stabilization of hepatic dysfunction before initiating ART, balancing the well-established benefits of early ART against the potential risks of inflammatory complications in the setting of uncontrolled coinfection.

The decision to defer antiretroviral therapy (ART) in this infant was based on clinical considerations aligned with current guideline recommendations. Although rapid ART initiation is strongly recommended for all children under one year of age, both the 2023 NIH Pediatric Antiretroviral Guidelines and the 2021 WHO Consolidated Guidelines acknowledge that short deferral may be appropriate in the presence of severe opportunistic infections or acute organ dysfunction, particularly when ART can be initiated during the same hospitalization. In this case, three concurrent conditions informed the decision: (1) severe hepatic dysfunction with markedly elevated transaminases and conjugated hyperbilirubinemia, in which potential ART-related hepatotoxicity and immune reconstitution inflammatory syndrome (IRIS) could complicate clinical assessment; (2) suspected CMV end-organ disease, for which guidelines support consideration of delaying ART initiation until after the initiation of anti-CMV therapy to reduce the risk of CMV-associated IRIS; and (3) severe acute malnutrition, where limited pediatric evidence suggests that a brief delay in ART during the acute phase may be associated with improved immunological and virological outcomes.[10,26,27]

For comparison, maternal viral load measured two months after reinitiating antiretroviral therapy was 141 copies/mL, reflecting substantial viral suppression under treatment. This value was markedly lower than the infant's viral load at diagnosis. Although maternal viral load during pregnancy was not documented, this case underscores the critical importance of sustained antiretroviral therapy before and throughout pregnancy as a cornerstone of effective PMTCT.

CONCLUSION

This case illustrates how severe HIV disease in early infancy may occur in the context of disruption along the PMTCT cascade, influenced by clinical, virologic, and psychosocial factors. The presentation of chronic diarrhea, severe malnutrition, pancytopenia, and hepatic dysfunction was consistent with advanced HIV disease at a very young age. In this patient, the absence of documented maternal viral suppression during pregnancy, interruption of maternal ART, and misclassification of neonatal transmission risk likely contributed to vertical transmission despite obstetric preventive measures. The case emphasizes that effective prevention of mother-to-child transmission requires more than the availability of antiretroviral therapy. Sustained maternal engagement in care, continuous viral load monitoring, accurate risk stratification at delivery, and timely evaluation and initiation of ART in exposed infants are essential to prevent early and severe pediatrics HIV.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest to disclose.

AUTHOR CONTRIBUTION

All authors equally contribute to the study from the conceptual framework, data acquisition, literature search, manuscript preparation, and editing.

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