HIV diagnosed in breastfed children after maternal testing at sibling's birth

Diagnóstico de HIV em crianças amamentadas após testagem materna no nascimento de irmãos

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ABSTRACT

Introduction: Breastfeeding provides numerous benefits for mothers, infants, and society. However, in the context of maternal HIV infection, it is contraindicated due to transmission risk. A critical consideration is the possibility of maternal HIV acquisition during breastfeeding, which poses a significant risk of transmitting the virus to the infant. **Objective:** To report two cases of pediatric HIV infection acquired through breastfeeding, in which the children were only diagnosed after their younger siblings' HIV testing prompted the maternal diagnosis. **Methods:** Retrospective review of medical records for both cases and follow-up. **Results:** Case 1: A three-year-old male, born to a mother who tested negative for HIV during pregnancy and at delivery. He was breastfed for two years and six months. The mother was diagnosed with HIV only two months before the birth of his sibling, which prompted the child's diagnosis. Case 2: An 18-month-old male, born to a mother who tested negative for HIV at delivery and was breastfed throughout this period. His mother's HIV diagnosis occurred at the time of his sibling's birth, which led to the child's diagnosis. **Conclusion:** These cases underscore the critical importance of routine clinical follow-up and repeated HIV testing during the breastfeeding period. Both children would have remained undiagnosed if not for the testing conducted during their siblings' births. Maternal HIV acquisition during breastfeeding must be considered to prevent undiagnosed pediatric infections.
Keywords: Breastfeeding. HIV. Vertical transmission.

RESUMO

Introdução: A amamentação oferece inúmeros benefícios para mães, bebês e a sociedade. No entanto, no contexto de infecção materna por HIV, ela é contraindicada em razão do risco de transmissão. Uma consideração crítica é a possibilidade de aquisição materna do HIV durante a amamentação, o que representa um risco significativo de transmissão do vírus ao lactente. **Objetivo:** Relatar dois casos de infecção pediátrica por HIV adquirida por meio da amamentação, em que as crianças foram diagnosticadas apenas depois que o teste de HIV de seus irmãos mais novos levou ao diagnóstico materno. **Métodos:** Revisão retrospectiva dos prontuários médicos para ambos os casos e acompanhamento. **Resultados:** Caso 1: Menino de 3 anos, nascido de mãe que testou negativo para HIV durante a gestação e no parto. Ele foi amamentado por dois anos e seis meses. A mãe foi diagnosticada com HIV apenas dois meses antes do nascimento do irmão, o que levou ao diagnóstico da criança. Caso 2: Menino de 18 meses, nascido de mãe que testou negativo para HIV no parto e foi amamentado durante todo esse período. O diagnóstico de HIV da mãe ocorreu no momento do nascimento do irmão, o que levou ao diagnóstico da criança. **Conclusão:** Esses casos destacam a importância crítica do acompanhamento clínico rotineiro e da repetição do teste de HIV durante o período de amamentação. Ambas as crianças teriam permanecido sem diagnóstico se não fosse pelo teste realizado durante o nascimento de seus irmãos. A aquisição materna de HIV durante a amamentação deve ser considerada para evitar infecções pediátricas não diagnosticadas.
Palavras-chave: Amamentação. HIV. Transmissão vertical.

INTRODUCTION

Breastfeeding plays a crucial role in transferring maternal antibodies, offering protection against various infections, particularly respiratory and diarrheal diseases. Additionally, breastfed children have lower incidences of asthma, diabetes, and obesity, benefits that persist even after weaning. The act of sucking promotes facial muscle development and proper breathing, which supports healthy dentition and facial growth. Maternal health also benefits significantly from breastfeeding, with reduced postpartum bleeding, lower rates of anemia, and decreased risk of breast and ovarian cancers. Furthermore, breastfeeding contributes to post-pregnancy weight recovery and fosters a strong maternal-infant bond[1].

The Brazilian Ministry of Health recommends exclusive breastfeeding for the first six months of life, with continuation for up to two years or beyond, even after introducing complementary foods[2]. Nevertheless, in the context of HIV, vertical transmission remains a significant concern. Transmission can occur during pregnancy (~35% of cases), labor and delivery (~65%), or breastfeeding, where the risk ranges from 7% to 22% per breastfeeding episode[3].

Despite the well-established benefits of lactation, it is contraindicated in HIV-positive mothers due to the risk of transmission to the breastfed. Cross-nursing is similarly discouraged. The use of formula feeding and pharmacological suppression of lactation at delivery has substantially reduced the risk of HIV transmission via breastfeeding[4,5]. The current challenge lies in cases where mothers acquire HIV during the lactation period, leading to vertical transmission of the virus through breast milk.

In this report, we present two separate cases of pediatric HIV infection involving distinct mother-child dyads, both of whom contracted the virus through breastfeeding following maternal HIV seroconversion after delivery. The first case involved a mother with no prenatal HIV diagnosis, while the second involved a teenager with no prenatal care. Both illustrate the risks of delayed maternal HIV testing during breastfeeding. In both cases, the children's HIV

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diagnoses were only made after routine HIV testing of their mothers at the births of their respective younger siblings. These cases underscore the critical importance of ongoing HIV surveillance in nursing mothers, especially in the absence of prenatal care or recent testing.

This report aimed to raise awareness of the risks associated with maternal HIV seroconversion during breastfeeding and its implications for vertical transmission, namely, the need for proper maternal counseling about the risks of acute HIV infection and its vertical transmission. This is an important chapter about the responsible hospital discharge of women in the puerperal period.

OBJECTIVE

To report two pediatric cases of HIV infection acquired through breastfeeding, in which diagnosis was only established following routine HIV testing of the mothers at the births of their younger children, leading to maternal diagnosis. These cases illustrate how maternal HIV seroconversion during lactation can result in vertical transmission of the virus through breast milk, particularly when HIV infection is not suspected due to negative serological tests at the time of delivery.

CASE REPORTS

Case 1

A three-year-old male was born via normal delivery to a 23-year-old mother with epilepsy and behavioral disturbances, under neuropsychiatric care. During pregnancy and at delivery, maternal serologies for sexually transmitted infections, including an HIV rapid test, were negative. The mother reported multiple sexual partners during and after the pregnancy but denied drug use, including injectables. Her first spouse, the father of the index child, was not tested for HIV, as the mother had tested negative at the time of delivery. Her second spouse, the father of the younger sibling, tested positive for HIV following the diagnosis of the mother.

The index child was breastfed for two years and six months. Two months prior to the birth of his younger sister, the mother was diagnosed with HIV infection. During the younger sister's first medical evaluation for potential HIV vertical transmission, the boy was also tested and found to be reactive for HIV on a rapid test. The sister's HIV status remains under evaluation, with negative viral loads at birth, one month, and four months of age. A rapid HIV test is pending at 18 months for confirmation.

The index child presented with a history of fever (38°C), asthenia, and dry cough. On evaluation, he was in good general health, active and reactive, with no signs of cyanosis or jaundice. He had well-hydrated mucosae and good capillary perfusion, though he remained febrile. Generalized lymphadenopathy, including enlargement of the right parotid gland, was noted. Poor dental health was observed but no abnormalities were seen in the oropharynx. A cardiovascular examination revealed a regular heart rhythm with a pulse rate of 112 beats per minute. Respiratory assessment showed bilateral vesicular breath sounds without adventitious noises, with a respiratory rate of 28 breaths per minute. The abdomen was soft and non-tender, with no visceromegaly, though Traube's space was obscure. Skin lesions consistent with prurigo strophulus were noted on the lower limbs.

Laboratory findings confirmed HIV infection, with an initial viral load of 286,000 copies/mL (log 5.456), later increasing to 380,000 copies/mL (log 5.580). The CD4 count was 354 cells/μL, indicative of severe immunosuppression (<15%). Antiretroviral therapy was promptly initiated with Zidovudine (AZT), Lamivudine (3TC), and Dolutegravir (DTG), along with prophylaxis for *Pneumocystis pneumonia* using Trimethoprim/Sulfamethoxazole. Forty-eight days after starting treatment, the child's viral load dropped to 36 copies/mL, and the CD4 count increased to 747 cells/μL. He continued regular medical appointments and showed good adherence to the treatment regimen.

Given the mother's behavioral disturbances and complex family dynamics, concerns about potential sexual abuse were raised but not substantiated, as no formal investigation was conducted.

Case 2

An 18-month-old male was born via normal delivery to a 17-year-old mother who did not receive prenatal care. During delivery, maternal serologies for sexually transmitted infections, including an HIV rapid test, were negative. The mother denied drug use, including injectable drugs. She had three children from two relationships. The first child, a six-year-old from her first relationship, tested negative for HIV. The second child, the index case, and the third child, a five-month-old girl, were from her second relationship. The younger sibling is still under investigation for HIV, with negative viral loads at birth.

The mother's second spouse, the father of the index child and younger sibling, tested positive for HIV after the child's diagnosis. The mother was diagnosed with HIV during the younger sibling's birth, which prompted the retrospective testing of the index child. This led to a reactive rapid HIV test for the 18-month-old boy.

The child's medical history included a 30-day episode of diarrhea, which resolved without antibiotics. At the time of his evaluation, he weighed 11.8 kg and was in good general health, with a normal physical examination. A rapid HIV test returned positive, and his initial viral load was 725,000 copies/mL (log 5.860). However, follow-up laboratory assessments, including a second viral load measurement, CD4 and CD8 counts, and HIV genotyping, were not performed.

Antiretroviral therapy was initiated with AZT, 3TC, and DTG, along with prophylaxis for *Pneumocystis pneumonia* using Trimethoprim/Sulfamethoxazole. Unfortunately, the child missed three scheduled follow-up appointments after the initiation of treatment. Due to these missed appointments, further monitoring of treatment adherence and clinical response was not possible.

While less likely based on the family context, the possibility of sexual abuse in this case was considered but not formally evaluated.

DISCUSSION

A negative HIV rapid test result at delivery should not be the sole criterion for ensuring breastfeeding safety in infants. Sexually active nursing mothers must be regularly evaluated and guided about their potential vulnerabilities, including sexual behavior, condom use, and the need for pre-exposure prophylaxis (PrEP)[6]. These mothers

should also be guaranteed ready access to HIV testing, especially during breastfeeding, when maternal seroconversion poses a substantial risk of vertical transmission. These two cases emphasize the need for reinforced HIV testing protocols and preventive measures, including regular postpartum testing and PrEP, to prevent such instances of HIV vertical transmission.

At the Municipal Program for Sexually Transmitted Diseases and AIDS of Campos dos Goytacazes (RJ), Brazil, we observed seven new cases of pediatric HIV infection between 2019 and 2024. Of these, two were confirmed to be acquired intrauterine, one was likely intrauterine, and four were attributed to breastfeeding in maternal HIV seroconversion during lactation (data not published). This report focused on two of the breastfeeding-related cases that remained hidden until routine maternal HIV testing was performed at the births of their younger siblings. These cases uniquely highlight the critical gaps in surveillance and the risks of delayed maternal HIV diagnosis. Globally, the incidence of mother-to-child transmission (MTCT) of HIV through lactation has increased, surpassing transmission rates during intrauterine and intrapartum periods, when early diagnosis and timely initiation of antiretrovirals lead to significant reductions[7].

Healthcare professionals must consider that maternal HIV infection close to delivery requires at least three weeks or more for antibodies to develop in sufficient quantities for detection. Early in this period, antibodies may circulate in small amounts as antigen-antibody complexes, leading to false-negative rapid test results and allowing lactation to begin under false assurances[8]. When maternal infection occurs during breastfeeding, the risk of transmission is high, with a rate of up to 28%, independent of breastfeeding duration. Transmission is most likely to occur within one to two months after maternal acquisition of HIV, particularly if the viral load is elevated[9].

The iconic study by Van de Perre et al. remains a cornerstone in understanding postnatal HIV transmission through breastfeeding[10]. Their prospective cohort study conducted in Kigali, Rwanda, demonstrated that HIV transmission rates significantly increased with breastfeeding duration, with the highest risks occurring in the early months postpartum. These findings underscored the critical need for interventions targeting nursing mothers to reduce the risk of vertical HIV transmission.

While our study reflects a different context and era, the fundamental challenges highlighted by Van de Perre et al.[10] remain relevant. Specifically, their work reinforces the importance of routine HIV testing and counseling for breastfeeding mothers to identify and mitigate risks associated with maternal HIV seroconversion. Our report builds on this foundation by drawing attention to hidden pediatric infections that may only be determined through retrospective maternal testing, emphasizing the ongoing need for surveillance and follow-up in both high- and low-resource settings.

Njom Nlend suggested that PrEP may be beneficial for women at high risk of acquiring HIV during breastfeeding, and this approach has been incorporated into many national HIV MTCT prevention protocols[11]. Additional strategies include retesting HIV-negative mothers postpartum, reinforcing maternal antiretroviral therapy if maternal viral load is detectable, and extending antiretroviral prophylaxis to HIV-exposed but uninfected infants[7]. Njom Nlend further noted that nearly 50% of new pediatric HIV infections result from breastfeeding, which undermines global efforts to eliminate MTCT by 2030[11]. Since 2022, the official recommendation by the Health State Secretary of Rio de Janeiro[12] has been the universal HIV testing for postpartum women, including during the breastfeeding period, as well as thorough counseling about the risks of HIV transmission through breast milk and cross-nursing. But that is far from reality.

In the first child, several clinical findings, such as underweight, generalized lymphadenopathy, parotid enlargement, and possibly an enlarged spleen (obscured Traube's space) could be attributed to HIV infection. The child also exhibited excessive irritability, which was addressed with neurological consultation and improved following the initiation of antiretroviral therapy. Notably, the patient gained 800g over two months, and his fever resolved.

In the second case, the child experienced a 30-day episode of diarrhea, which, although not affecting growth, was likely a manifestation of HIV infection. Both cases highlight the importance of HIV testing at the time of delivery to identify maternal HIV seroconversion, especially in women lacking prenatal care. Early identification and intervention are crucial to preventing postnatal HIV transmission through breastfeeding.

Strengths

This manuscript highlights two cases of pediatric HIV infections acquired through breastfeeding, drawing attention to the under-recognized risk of maternal HIV seroconversion during lactation. Detailed clinical data and therapeutic outcomes underscore the importance of timely diagnosis and treatment. At the same time, the contextualization within local and global epidemiological frameworks offers practical insights for improving maternal and child healthcare practices. By emphasizing the need for routine maternal HIV testing during breastfeeding, the study addresses a significant gap in current prevention strategies.

Limitations

The retrospective design and the focus on two specific cases limit the generalizability of the findings, as they may not fully represent the broader population of HIV-infected infants. Additionally, missing follow-up data for one child reduces the completeness of the clinical narrative, emphasizing the challenges of maintaining long-term monitoring in resource-limited settings. Although the study discusses routine maternal HIV testing and preventive measures like PrEP, it does not deeply explore the systemic barriers to implementing such strategies, particularly in settings with limited healthcare infrastructure. Addressing these barriers would enhance the study's applicability to diverse contexts.

Another significant limitation is the absence of molecular confirmation through viral sequence analysis to establish definitive vertical transmission in these cases. While biomolecular evidence would strengthen the causal link between maternal HIV seroconversion during lactation and children's infections, it was not feasible within the scope of this retrospective analysis. Instead, the transmission pathway was inferred based on clinical and epidemiological data, including the timing of maternal seroconversion, breastfeeding history, and the subsequent diagnoses of the children.

This approach reflects standard practices in resource-limited settings, in which the combination of maternal and child clinical data is

often used to identify probable routes of transmission. Nevertheless, we recognize the importance of molecular confirmation and acknowledge this limitation. These findings underscore the critical need for routine maternal and child follow-up protocols to prevent hidden infections and suggest that future studies incorporating viral sequence analysis would provide more definitive conclusions.

CONCLUSION

Breastfeeding offers significant benefits for both mothers and infants, but it must be recommended with careful attention to potential risks, particularly HIV. While a negative HIV rapid test at delivery provides initial reassurance, the possibility of postnatal HIV acquisition in sexually active nursing mothers should not be overlooked. These cases highlight a critical risk: both children would have remained undiagnosed and untreated had their mothers not undergone testing because of the birth of a subsequent child. This underscores the need for continuous medical follow-up, routine HIV testing for nursing mothers, and timely interventions such as PrEP in relevant cases. Ensuring that these measures are in place can safeguard the health of both mothers and their children, preventing undiagnosed HIV infection and improving overall outcomes.

Approval by the Human Research Ethics Committee

All research activities were conducted under the ethical principles outlined in the Declaration of Helsinki by the World Medical Association (https://www.wma.net/policies-post/wma-declaration-of-helsinki/) and complied with the regulations of the National Research Ethics Committee, as part of the initiatives of the study of the short- and long-term consequences of exposure to HIV and antiretrovirals: analysis of the cohort of minors monitored in the Municipal Program for Sexually Transmitted Diseases and AIDS of Campos dos Goytacazes, RJ, endorsed by the Regional Committee of the Faculty of Medicine of Campos dos Goytacazes.

Participation of each author

IBM: Conceptualization, Data curation, Formal analysis, Investigation, Writing – review. RCSCF: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Validation, Writing – original draft, Writing – review & editing. EMA: Conceptualization, Methodology, Formal analysis, Investigation, Validation, Writing – original draft, Writing – review & editing.

Funding

The authors declare no financial support.

Conflicts of interest

The authors declare no conflicts of interest.

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Received on: 10/24/2024
Accepted on: 03/25/2025

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