

# Outcomes of Infants at Risk of Mother-to-child Transmission of Human Immunodeficiency Virus in a Regional Hospital in Hong Kong

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## Abstract

Five infants were born to human immunodeficiency virus (HIV)-infected women from 2002 to 2006 in a regional hospital in Hong Kong. Four of the 5 women were residents in Mainland China. Among them, three women had no antenatal care and their first presentation to the local healthcare system was advanced labour at the Accident and Emergency Department. As a result, antenatal and intrapartum antiretroviral chemoprophylaxis was not given and postnatal chemoprophylaxis in the newborn was delayed. Three infants, including the two whose mothers' infection was diagnosed antenatally, were free of HIV infection. One child was eventually infected with HIV while the other child did not return for follow-up. Thus, the report suggests that the majority of infants at risk for perinatal HIV transmission are born by non-resident women, whose unique health-seeking behaviour undermines the efficacy of peripartum management to prevent mother-to-child transmission of HIV.

## Key words

Disease transmission, vertical; HIV; Prevention and control; Zidovudine

## Introduction

With the increasing number of women of child-bearing age infected with the human immunodeficiency virus (HIV), the incidence of HIV infection in children through vertical or mother-to-child transmission (MTCT) continues to rise worldwide. Various interventions have proven to be efficacious in reducing the risk of MTCT,<sup>1</sup> but socio-economic barriers prohibit their successful

implementation in many parts of the world. In Hong Kong, universal antenatal HIV screening has been implemented since September 2001.<sup>2</sup> Treatment of the expecting mother before and during labour, avoidance of breastfeeding, and postnatal antiretroviral treatment of the newborn have reduced the risk of MTCT of HIV by 50-70%.<sup>1-2</sup>

The increasing number of women from Mainland China travelling to Hong Kong for delivery, however, appears to challenge the effectiveness of the preventive programme. This is especially worrying as the rates of HIV-infected women in the child-bearing ages have exceeded 1% in many Chinese provinces including Yunnan, Henan and Xinjiang.<sup>3</sup> In addition, many of these pregnant women have adopted a strategy of omitting antenatal care and rushing to the hospitals when they are in advanced labour,<sup>4</sup> probably because of financial considerations. Prior to 2007 when rapid HIV testing was not available, the healthcare system in Hong Kong had been unprepared for such scenarios. This case series was therefore reported to illustrate the medical management and outcomes of infants born during the interim period.

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## Case Reports

From January 2002 to December 2006, five newborns, whose mothers were tested positive for HIV infection, were delivered in Tuen Mun Hospital (see Table 1). Four of the five women were not local residents and they came from Mainland China for confinement. Only two women (Cases 1 and 2), including the resident lady, had had antenatal care in Hong Kong and their HIV-infected status were detected and were given antiretroviral treatment from the first trimester of pregnancy and during intrapartum period, using zidovudine in one case and zidovudine, lamivudine and lopinavir/ritonavir (Kaletra) in the other case. Both children were free from HIV infection.

In the remaining three cases (Cases 3-5), the pregnant women came to Hong Kong close to the time of delivery. None of them had had antenatal care and they rushed to the hospital when they were in labour. Testing of HIV was only carried out after admission and the positive results were obtained 48-72 hours after delivery from the government laboratory. The babies were then recalled and re-admitted for baseline assessment, parental counselling, and commencement of antiretroviral treatment.

After the initial assessment, all but the local resident's baby went back to Mainland China with their parents. Only three of them returned for follow-up and completed the 6-week course of zidovudine treatment followed by prophylactic cotrimoxazole therapy against pneumocystis jiroveci pneumonia. Two (Cases 1 and 4) were subsequently tested negative for HIV by polymerase chain reaction during the first 6 months of life and by serology after 18 months of age. The remaining child (Case 5) was eventually

documented to be HIV-infected, with RNA copies of  $2.2 \times 10^5$  and  $2.6 \times 10^6$ /mL at 6 and 10 weeks of life, respectively, despite zidovudine chemoprophylaxis. Subsequent highly active antiretroviral therapy (HAART) comprising zidovudine, lamivudine and lopinavir/ritonavir (Kaletra) was started at 12 weeks of age and reduced plasma viral load to undetectable level.

## Discussion

Following the landmark study of the Pediatric AIDS Clinical Trials Group Protocol 076 that showed a significant reduction of vertical transmission of HIV after peripartum treatment with zidovudine from 25.5% to 8.3%,<sup>5</sup> subsequent studies also support the effectiveness of other antiretroviral regimens and elective use of Caesarian section in the prevention of MTCT of HIV, with risk reduction from 15-20% to less than 2% after various interventions.<sup>1</sup> In 2001, the Department of Health published guidelines calling for universal antenatal HIV testing followed by timely administration of antiretroviral therapy, judicious use of Caesarian section and abstinence of breastfeeding to stop perinatal HIV transmission.<sup>6</sup> The effectiveness of the programme has recently been published.<sup>2</sup>

Ideally, antiretroviral treatment should be prescribed to the expecting woman during pregnancy and labour, followed by treatment with the same agent in the infant immediately after birth.<sup>5</sup> Even when the HIV status of the woman is only known at the time of labour, it is still useful to administer antiretroviral treatment intrapartum and postnatally. However, it is probably futile when

**Table 1** Clinical summary and outcome of infants with perinatal exposure to human immunodeficiency virus infection

Case	Presenting month/year	Infant's sex	Mother's residence status	Time of HIV diagnosis (1)	Intrapartum treatment	Postpartum treatment	Breast feeding	Oral polio vaccine	MTCT
1	Apr 2002	Male	Non-resident	Antenatal	AZT	AZT	No	No	No
2	Jan 2004	Male	Resident	Antenatal	AZT	AZT	No	No	No
3	Apr 2005	Male	Non-resident	Postnatal	Nil	AZT (2)	Yes	Yes	Unknown
4	Feb 2006	Female	Non-resident	Postnatal	Nil	AZT (3)	Yes	Yes	No
5	Aug 2006	Male	Non-resident	Postnatal	Nil	AZT (3)	Yes	Yes	Yes

(1) Antenatal diagnosis was made in the first 2 cases during the first trimester of pregnancy and was followed by anti-retroviral treatment. In infants whose diagnosis was made postnatally, the positive result was obtained between 48-72 hours of life. All the infants were discharged and had to be called back to the hospital for further management.

(2) Zidovudine treatment was commenced on Day 4 of life. A full course of treatment was prescribed but the patient did not return for follow-up.

(3) Zidovudine treatment was commenced on Day 3 of life.

Abbreviations: AZT, zidovudine; HIV, human immunodeficiency virus; MTCT, mother-to-child transmission of HIV

antiretroviral treatment is only commenced in the newborn infant beyond 3 days of life.<sup>7</sup> The present case series illustrates clearly how the health-seeking behaviour of expecting women from the Mainland has undermined the efficacy of the 2001 preventive programme against MTCT of HIV infection. A recent report has found that HIV testing has been omitted in 22% of the women giving birth in Hong Kong and suggests that these are probably non-local expectant women who present late to the healthcare system.<sup>7</sup>

The latest guidelines updated by the Department of Health on the prevention of perinatal HIV transmission, in which rapid testing for HIV antibody is recommended for women who have not undergone screening earlier during pregnancy, has been a step forward to circumvent the deficiency of the previous guidelines.<sup>8</sup> Currently, four rapid HIV antibody tests are approved by the US Food and Drug Administration and all have sensitivities and specificities of at least 99%.<sup>9</sup> In a pilot study carried out by the Special Preventive Programme of the Centre for Health Protection, 224 participants were tested simultaneously with a rapid and the conventional HIV antibody tests.<sup>10</sup> The 5 individuals who tested positive on the rapid test were also tested positive on the conventional test and none of the 219 individuals who were negative on the rapid test had positive result on conventional testing. The results of these point-of-care tests are available within minutes, and any positive findings can justify the immediate use of prophylactic interventions against MTCT of HIV, although confirmatory test by Western Blot is still required. Revision of the local guidelines is important as the current report suggests that the majority of infants at risk for MTCT in Hong Kong are born by women normally residing without antenatal HIV testing elsewhere. As the number of births given by Mainland women continues to soar from 10,128 in 2003 to 19,538 in 2005, the importance of the use of rapid HIV antibody tests cannot be overemphasised.<sup>11</sup>

However, the availability of rapid HIV antibody testing does not solve the whole problem. It is also important that women coming to Hong Kong for delivery should be educated about the importance of antenatal care and to present themselves to healthcare facilities at the earliest signs of labour instead of taking the healthcare workers by surprise by arriving at the last minute of delivery. This is not only important to facilitate intrapartum antiretroviral treatment in case the rapid test is positive, but also to improve the obstetric outcome as a whole.<sup>4</sup> The fact that most of the non-resident women rear their Hong Kong-born offspring in Mainland China also raises concern on

the adequacy of follow-up care for HIV-exposed infants. Problems anticipated include the supervision of the antiretroviral treatment, monitoring for short-term and long-term treatment toxicities, and subsequent confirmation of their HIV infection status.

In summary, the rapidly changing socioeconomic situation and the increasing traffic between the Hong Kong-Mainland China border have created a unique challenge to the prevention of mother-to-child transmission of HIV. The mandatory requirement of pre-arranged antenatal care and registration for hospital admission before pregnant women from the Mainland can come to Hong Kong for confinement may be a helpful measure.<sup>11</sup> With the introduction of rapid HIV testing at the point-of-care, timely intrapartum and postnatal antiretroviral therapy to reduce the risk of HIV transmission to the newborn infant can be further enhanced.

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