



Abstract

Background: A reduction in vertical transmission rates has been demonstrated in European cohorts since the advent of antiretroviral therapy (ART) and elective caesarean section (CS). In the UK and Ireland, comprehensive population surveillance of paediatric and obstetric HIV has been ongoing since 1986 and 1990 respectively.

Methods: Pregnancies in women with diagnosed HIV infection in the UK and Ireland are notified to the National Study of HIV in Pregnancy and Childhood through a confidential, voluntary, active reporting scheme, and infants are followed up to establish infection status. Logistic regression analysis was carried out using Stata.

Results: 4229 infants born to diagnosed HIV infected women from 1990 to 2004 were reported, and infection status was confirmed for 87.6% (3703/4229). Vertical transmission rates declined from a high of 25.6% (10/39, 95% confidence interval [CI]: 12.3%-47.2%) in 1993 to 1.1% (9/797, 95% CI: 0.5%-2.1%) in 2004, and were <2% each year since 2000.

In multivariable analysis, transmission rates were 4 times lower following elective CS (AOR=0.25, 95% CI: 0.14-0.45, $p<0.001$), and 1.7 times lower following emergency CS (AOR=0.58, 95% CI: 0.32-1.05, $p=0.074$), compared with vaginal delivery. Mono/dual therapy was independently associated with a 7-fold reduction (AOR=0.14, 95% CI: 0.08-0.28, $p<0.001$) and highly active ART (HAART) with a 10-fold reduction in the risk of transmission (AOR=0.09, 95% CI: 0.05-0.16, $p=0.001$), compared with no ART.

Among ~2500 women on HAART, elective CS was associated with a 3-fold reduction in transmission (OR=0.34, 95% CI: 0.13-0.87, $p=0.025$), compared with vaginal delivery. The risk of transmission was 1.7 times higher for female than for male infants (AOR=1.7, 95% CI: 1.0-2.7, $p=0.036$), after adjusting for ART and mode of delivery. In 697 mother-child pairs with exposure to ART and vaginal delivery, prematurity (<32 weeks) was significantly associated with vertical transmission (AOR=7.3, 95% CI: 2.0-27.6, $p=0.003$).

Conclusions: This surveillance study includes all diagnosed HIV-infected pregnant women reported from across the UK and Ireland, regardless of uptake of interventions or timing of diagnosis. The fact that transmission rates in this diverse and unselected population were <2% from 2000 to 2004 is encouraging. These findings support the suggestion that female gender and prematurity are risk factors for transmission, and that mode of delivery remains important even in the HAART era.

Introduction

- Mother-to-child transmission (MTCT) rates of HIV in European cohorts declined from ~25% to ~2% following the introduction of antiretroviral therapy (ART) and elective caesarean section (CS) in the mid-1990s.
- Recent guidelines recommend highly active ART (HAART) to reduce the risk of MTCT, or monotherapy for women who do not require HAART for their own health.
- For women receiving HAART and achieving viral suppression, it is not clear whether elective CS provides an added benefit in terms of MTCT; some women are choosing to deliver vaginally.
- In some studies, a higher risk of transmission has been observed among girls than boys. It has also been suggested that prematurity increases the risk of transmission.

Methods

Design: National Study of HIV in Pregnancy & Childhood (NSHPC)

- Confidential, active surveillance scheme for pregnancies in HIV-infected women attending for antenatal care and HIV-infected children & infants born to infected women
- Run under the auspices of the Royal College of Obstetricians & Gynaecologists and the Royal College of Paediatrics & Child Health (British Paediatric Surveillance Unit)

Analysis:

- Infants born 1990-2004 to HIV-infected women diagnosed before delivery and reported by September 2006; excludes infants born in 2005 due to incomplete data on infection status.
- Data managed in a Microsoft Access 2002 database and analysed in Stata 9.

Results

- Infection status was confirmed for 87.6% (3703/4229) of infants.
- MTCT rates declined from 25.6% in 1993 to 1.1% in 2004 (95% confidence interval [CI]: 0.5%-2.1%) (see Fig 1).
- Table 1 shows adjusted odds ratios (AORs) for MTCT, obtained by logistic regression.
- Among ~2500 infants exposed to HAART, elective CS was associated with a 3-fold reduction in MTCT (OR=0.36, 95% CI: 0.13-0.87, $p=0.025$), compared with vaginal delivery (see Fig 2).
- The association remained after adjusting for prematurity (<35 weeks) and sex (AOR: 0.36, $p=0.034$).

Figure 1: Uptake of antiretroviral therapy and mother-to-child transmission (MTCT) rates (with 95% confidence interval) by year of birth for 3703 infants born to diagnosed women

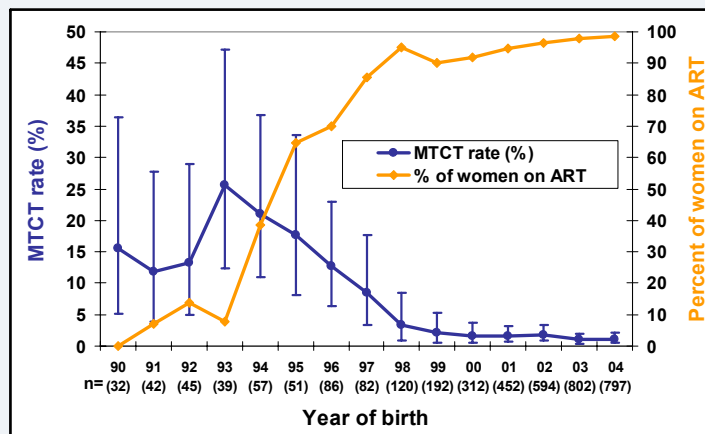


Figure 2: Mother-to-child transmission rates by antiretroviral therapy and mode of delivery

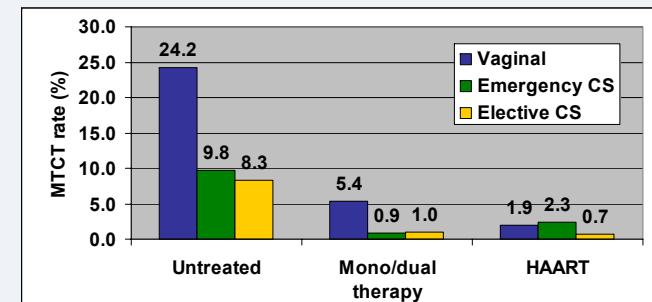


Table 1: Relative risk of mother-to-child transmission

* odds ratios in this table are adjusted for ART and mode of delivery (as in abstract), as well as gender & gestation

	MTCT rate (%)	AOR (95% CI)	p-value
No ART	17.9	1.00	
Mono/dual therapy	2.1	0.13 (0.07, 0.24)	<0.001
HAART	1.2	0.08 (0.05, 0.14)	<0.001
Vaginal delivery	5.9	1.00	
Emergency CS	2.5	0.51 (0.28, 0.94)	0.029
Elective CS	1.0	0.29 (0.17, 0.49)	<0.001
Male	2.4	1.00	
Female	3.7	1.65 (1.05, 2.60)	0.030
Gestation ≥35 weeks	3.0	1.00	
Gestation <35 weeks	4.1	1.77 (0.89, 3.49)	0.102

AOR=adjusted odds ratio, CS=caesarean section

- In a subgroup analysis of 697 infants whose mothers were on ART and delivered vaginally, prematurity (<32 weeks) was significantly associated with MTCT (OR=7.3, 95% CI: 2.0, 27.6, $p=0.003$).

Conclusions

- This surveillance study includes diagnosed HIV-infected pregnant women reported from across the UK and Ireland, regardless of uptake of interventions or timing of diagnosis; the fact that transmission rates in this diverse and unselected population were <2% from 2000 to 2004 is encouraging.
- These findings support the suggestion that female gender and prematurity are risk factors for transmission, and that elective caesarean section continues to confer benefit even in women receiving HAART.