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CLINICAL ARTICLE

Management and outcomes of pregnancies among women with HIV in Oxford, UK, in 2008–2012

Sarah Montgomery-Taylor [a], Joris Hemelaar [b,c,*]

[a] Imperial College Healthcare NHS Trust, St Mary's Hospital, London, UK
[b] Nuffield Department of Obstetrics and Gynaecology, University of Oxford, The Women's Centre, John Radcliffe Hospital, Oxford, UK
[c] Peter Medawar Building for Pathogen Research, University of Oxford, Oxford, UK

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ABSTRACT

Objective: To evaluate the management and outcomes of pregnancies among women with HIV infection. *Methods:* A retrospective cohort study was undertaken of pregnant women with HIV who delivered at one center in the UK in 2008–2012. Case notes were reviewed and detailed information extracted regarding obstetric and virological management. *Results:* Overall, 61 pregnancies were included; 43% (26/60) were unplanned and 39% (22/57) booked late. HIV infection was diagnosed during pregnancy for 32% (19/60); 71% (12/17) were diagnosed after the first trimester. At booking, 47% of women (28/60) were not on treatment, all but one of whom commenced treatment, either for maternal reasons (CD4 count <350 cells per mm^3; 48% [13/27]) or prevention of mother-to-child-transmission (52% [14/27]). Viral load was high (>50 copies per mL) at delivery for 13% of women (8/61). Delivery was by cesarean for 74% [45/61]. One neonate was diagnosed with HIV infection. There were 6 (10%) preterm births, 9 (15%) cases of low birth weight, 11 (18%) small-for-gestational-age neonates, and 1 (2%) stillbirth. *Conclusion:* Better pregnancy planning, earlier booking and HIV diagnosis, and optimal antiretroviral treatment should increase the proportion of women with a low viral load (<50 copies per mL) at delivery, lead to more vaginal deliveries, and further reduce mother-to-child transmission of HIV.

1. Introduction

The prevalence of HIV among women giving birth in England is 0.2%, is increasing nationally, and remains highest in London (0.3%–0.4%) [1]. Current practice for the management of HIV in pregnancy is guided by a number of national clinical guidelines [2,3]. The aims are to identify individuals infected with HIV through a prenatal screening program and institute antiretroviral treatment to prevent disease progression in the mother and/or prevent mother-to-child transmission (MTCT). Uptake of prenatal HIV screening in the UK is high (95%–97% for 2008–2011) [4]. According to the National Study of HIV in Pregnancy and Childhood, the rate of MTCT in the UK and Ireland in 2007–2011 was 0.68%, with a steady decrease recorded since 2000 [5].

In addition to MTCT, maternal HIV infection is associated with several other adverse perinatal outcomes, including preterm birth, low birth weight, intrauterine growth restriction, and stillbirth [6]. Despite the benefits of antiretrovirals in reducing MTCT of HIV, studies have suggested a correlation between exposure to antiretrovirals and adverse pregnancy outcomes, particularly preterm birth [7,8]. These effects could be dependent on the type of antiretrovirals and the timing of antiretroviral initiation in relation to pregnancy [7,9–15].

To achieve optimal pregnancy outcomes, the implementation of guidelines needs to be monitored [5]. However, up-to-date detailed information on virological and obstetric management of HIV-positive pregnancies in the UK is very limited, especially outside London [16,17]. Therefore, the aim of the present study was to evaluate management and outcomes of pregnancies among women with HIV to identify what improvements can be made.

2. Materials and methods

A retrospective cohort study was undertaken of pregnant women with HIV who delivered at the John Radcliffe Hospital, Oxford, UK, between January 2008 and December 2012. The study was registered with the institutional audit department; formal ethical approval and consent procedures were not required. Data extracted from notes were immediately anonymized on collection and held in secure electronic data files.

Eligible women were initially identified via the electronic OXMAT (Oxford Maternity) database. This information was cross-referenced with other databases held by the community HIV support team and the genitourinary medicine department to ensure all pregnancies had been identified.

* Corresponding author at: Nuffield Department of Obstetrics and Gynaecology, University of Oxford, The Women's Centre, John Radcliffe Hospital, Oxford OX3 9DU, UK. Tel.: +44 1865 221021; fax: +44 1865 769141.
E-mail address: joris.hemelaar@obs-gyn.ox.ac.uk (J. Hemelaar).

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Data for maternal characteristics, sexual health, contraception, obstetric history, HIV laboratory investigations, antiretroviral treatment, delivery, and neonatal characteristics were examined. Every pregnancy was treated as a separate case for the purposes of analysis, except for that of demographics.

The effects of some key variables in HIV management in pregnancy on outcomes previously shown to be adversely affected by HIV and/or antiretrovirals—gestational age at birth, birth weight, and weight adjusted for gestational age—were explored. Birth weight and gestational age were analyzed with an unpaired *t* test in QuickCalcs 2014 (Graphpad, La Jolla, CA, USA), because the data were normally distributed. Gestational adjusted weights were analyzed with a Fisher exact test on a 2 × 3 contingency table using 'in-silico' online tools (http://in-silico.net/tools). $P < 0.05$ was considered statistically significant.

3. Results

A total of 74 pregnancies among women with HIV in 2008–2012 were identified, and notes for 61 were located and analyzed. These 61 pregnancies were in 56 different patients: three women had two pregnancies and one had three pregnancies in the study period.

Most (82%) included women were black African (Table 1). The most common risk factor for HIV acquisition was an origin from an HIV-endemic country (e.g. Zimbabwe), although many women also had a high-risk partner. Most (68%) women had been diagnosed with HIV infection before conception. Among the women who were diagnosed during pregnancy, the timing of diagnosis tended to depend on when the patient first presented (i.e. booking); 12 (71%) of 17 for whom data were available were diagnosed after the first trimester.

The most common contraceptive used before pregnancy was condoms, although almost half the women reported no contraceptive use, a finding reflected in the high proportion of unplanned pregnancies (Table 2). There was no significant difference in the proportion of unplanned pregnancies in those known to be infected before conception compared to those diagnosed after conception (41% vs 47%; $P = 0.78$). More than one-third of women (39%) presented after 13 weeks of pregnancy (Table 2). Overall, 80% of women were multiparous (Table 2).

Just over half (53%) of women were already taking highly-active antiretroviral therapy (HAART) at booking (Table 3). More than three-quarters (78%) of women already on treatment at booking had a viral load of less than 50 copies per mL at booking, whereas only 7% of those not on treatment had a viral load of less than 50 copies per mL at booking.

Among the 27 who started HAART treatment during pregnancy, approximately half (52%) did so to prevent MTCT and half (48%) for maternal reasons (Table 3). All but two of these women had started treatment by 28 weeks. All women had started treatment by delivery except for one, who was diagnosed with HIV infection after delivery following a concealed pregnancy. Among the eight (13%) women who had a viral load of more than 50 copies per mL at delivery, five had a viral load of less than 400 copies per mL and the remaining three had a viral load of more than 10 000 copies per mL (Fig. 1).

Of the women diagnosed during pregnancy, one-third had a late diagnosis (CD4 < 350 cells per mm^3) and none had a very late diagnosis (CD4 < 200 cells per mm^3) (Table 3). At booking, the median CD4 counts were higher in the group on treatment at conception than in women who had not started treatment (545 vs 350 cells per mm^3; $P = 0.067$).

Most women were on either of two HAART regimens: two nucleoside reverse transcriptase inhibitors and one non-nucleoside reverse transcriptase inhibitor or two nucleoside reverse transcriptase inhibitors and two protease inhibitors (Table 3). Overall, 12 (20%) women changed treatment during pregnancy, with the two most common reasons being intolerance and treatment failure (Table 3).

Although almost one-fifth of women had complications during pregnancy (Table 4), individual complications were infrequent: hyperemesis was the most common complication, but only affected 3 (5%) women. Among 39 women for whom elective cesarean delivery was planned, 29 (74%) went on to deliver in this way, 7 (18%) had an emergency cesarean, and 3 (8%) delivered vaginally. Among the 20 who planned to give birth vaginally, 11 (55%) of them did so, and 9 (45%) had an emergency cesarean. Overall, 45 (74%) women delivered by cesarean. Postnatal complications were uncommon (Table 4), with

Table 1
Maternal characteristics.

Characteristic	Value[a]
Ethnic origin (n = 55)	
Black African	45 (82)
Black Caribbean	0
White	5 (9)
Other	5 (9)
Born in the UK (n = 52)	4 (8)
Age at conception, y (n = 60)	31 (28–35)
Age at HIV diagnosis, y (n = 45)	29 (24–31)
HIV diagnosis (n = 60)	
Before conception	41 (68)
During pregnancy	19 (32)
Length of pregnancy when HIV diagnosed if not known before conception, wk (n = 17)	15 (11–20)
Risk factors for HIV acquisition by patient	
Vertical transmission (n = 12)	0
From HIV-endemic country (n = 55)	46 (84)
HIV-positive RMP (n = 7)	1 (14)
High-risk RMP (n = 48)	33 (69)
Intravenous drug user (n = 9)	0
RMP details	
RMP exists (n = 54)	48 (89)
RMP is newborn's father (n = 26)	25 (96)
RMP aware of patient's HIV diagnosis (n = 12)	10 (83)
RMP has HIV infection (n = 5)	2 (40)
RMP has had an HIV test (n = 3)	3 (100)
Social history	
Alcohol intake (n = 48)	6 (13)
Smoking (n = 60)	2 (3)
Recreational drug use (n = 2)	1 (50)
Employed (n = 50)	36 (72)
Lives alone (n = 43)	6 (14)
Housing issues (n = 16)	7 (44)
Financial issues (n = 22)	6 (27)

Abbreviation: RMP, regular male partner.
[a] Values are given as number (percentage) or median (interquartile range).

Table 2
Contraception, booking, and obstetric history.

Characteristic	Value[a]
Contraceptive used (n = 51)[b]	
Condom	15 (29)
Depo-Provera	6 (12)
Implant	3 (6)
Coil	3 (6)
Oral contraceptive pill	1 (2)
None	24 (47)
Pregnancy unplanned (n = 60)	26 (43)
Among women diagnosed with HIV before pregnancy (n = 41)	17 (41)
Among women diagnosed with HIV during pregnancy (n = 19)	9 (47)
Last menstrual period known (n = 61)	50 (82)
Length of pregnancy at booking, wk (n = 57)	11 (9–21)
Late booking (≥13 wk) (n = 57)	22 (39)
Parity (n = 61)	
Nulliparous	12 (20)
1	20 (33)
2	15 (25)
≥3	14 (23)
History of stillbirth (n = 61)	1 (2)
History of induced abortion (n = 61)	16 (26)
History of spontaneous abortion (n = 61)	18 (30)
History of premature delivery (n = 61)	2 (3)

[a] Values are given as number (percentage) or median (interquartile range).
[b] Could report more than one.