

Use of assisted reproductive technology to separate sperm from human immunodeficiency virus infected men resulting in pregnancy among serodiscordant couples

ABSTRACT

Due to HIV care improvement, discordant couples more frequently seek help in order to conceive their own biological child. Besides the advance of antiretroviral therapy, unprotected intercourse is not a complete safe option, carrying a low but still present risk of HIV transmission. We report 10 serodiscordant couples in whom the male partner is HIV positive, submitted to sperm washing and intrauterine insemination. The procedure resulted in four pregnancies and no HIV transmission to mother or child was observed. Techniques of assisted reproduction can help HIV discordant couples to conceive biological offspring and is a safer option than unprotected intercourse.

Keywords: HIV-1; pregnancy; insemination; artificial reproduction.

INTRODUCTION

Human immunodeficiency virus (HIV) infection is nowadays classified as a chronic disease. Significant advances in HIV treatment appear to have delayed the onset of AIDS and its consequences in many infected people. When an affected couple requests assistance to have their own genetically related child, they are advised to seek care at institutions with the facilities that can provide the most effective evaluation, treatment and follow-up. Alternatively, they may be advised to look for other options, such as sperm donor, adoption, or not having children.¹ This publication aims to report pregnancies following intrauterine insemination in HIV type 1 (HIV-1) seronegative women after the use of processed semen from their seropositive husband. Men who are HIV-1-infected (HIV+) cannot have children with their seronegative female partners via sexual intercourse if they want to avoid transmitting the virus through the semen. Semen samples were processed using isolate and swim-up techniques. The purpose of this study was to assist HIV+ men whose wives are HIV-1 negative (HIV-) and desire to have children. Rather than attempting to achieve a pregnancy through unprotected intercourse, women were inseminated with sperm that had been processed and tested to

have undetectable levels of HIV. Semprini et al.² published on the first birth of healthy children from HIV serodiscordant couples (HIV-S) in whom the man was infected.

CASE REPORT

Ten intrauterine inseminations were analyzed. All men were on anti-retroviral medication and presented undetectable plasma HIV-1 viral loads. Following a sexual abstinence period between 2-5 days, semen samples were collected by masturbation. Processing techniques were used to obtain sperm samples free from HIV-1, as followed: sperm fractions with high motility were isolated using discontinuous gradient centrifugation and repeated washing, followed by a swim-up procedure. A fraction of the final volume was tested with an ultrasensitive method of HIV-1 RNA detection with a threshold of 50 copies. The remainder of the final volume was cryopreserved for future use, and stored on an exclusive container for these samples. The purpose for the cryopreservation of the final volume was to store the sperm until the laboratory processes the sample to obtain the results of HIV testing. As a condition for continuing the treatment, the results of the testing of the final product must show HIV levels below the detection limit of the test.

Authors

Alessandro Schuffner¹
Ana Paula Lisboa²
Vinicius Bonato da Rosa³
Monica Maria Gomes da Silva⁴

¹MD, Ex-fellow at Jones Institute for Reproductive Medicine, USA; Obstetrician and Gynecologist Specialist; Physician at Conceber, Reproductive Medicine Center, Curitiba, PR, Brazil

²Obstetrician and Gynecology Specialist; Reproductive Endocrinology Specialist; Physician at Conceber Reproductive Medicine, Curitiba, PR, Brazil

³Biologist and Embryology Specialist; Biologist at Conceber Reproductive Medicine, Curitiba, PR, Brazil

⁴MD, MSc, Infectious Diseases Specialist (SBI); Neurology Specialist (ABN); Hospital Nossa Senhora das Graças, Infectious Diseases Department, Curitiba, PR, Brazil

Submitted on: 01/13/2011
Approved on: 05/14/2011

Correspondence to:
Monica Maria Gomes da Silva
Av. República Argentina,
210/17^o
80240-210
Curitiba, Brazil
Phone/fax:
+55(41) 3039-5556
monica.mgomes@gmail.com

We declare no conflicts of interest.

©2011 Elsevier Editora Ltda.
Este é um artigo Open Access sob
a licença de [CC BY-NC-ND](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Before treatment, couples were submitted to a complete infertility work up. All women undergone ovarian stimulation with gonadotrophins, as published elsewhere,³ in order to obtain more than one follicle, which increases pregnancy rates.

All women were < 35 years of age. Out of 10 intrauterine inseminations, four pregnancies were obtained (40% pregnancy rate). All women were tested for HIV-1 one and three months after insemination. Neither women nor babies have been seroconverted after one year of follow-up.

DISCUSSION

It is estimated that nearly 40 million people worldwide are infected with HIV. HIV/AIDS prevalence among young people is high, with people under the age of 25 years accounting for approximately half of all new cases.⁴

HIV has significantly affected human reproduction in terms of its widespread prevalence and its effect on the ability to safely conceive a child if one partner is infected. The improvement in the quality of life and the increase in the asymptomatic period of infected people have given much hope of starting a family and living a "normal life". Family and pregnancy planning issues have become important for HIV+ men and women.⁵

Couples who are HIV-1 serodiscordant often desire to have biological children of their own and hope to minimize the risk for transmission of HIV-1 to the mother and child. Advances in assisted reproductive techniques (such as sperm washing techniques and *in vitro* fertilization-intracytoplasmic sperm injection) coupled with the improvements in HIV care, currently permit couples to raise a family and remain healthy.

Recently, the Brazilian Government published recommendations to use ARV to prevent HIV transmission between heterosexual partners trying to conceive a child.⁶ For a seropositive man with a seronegative woman, the use of ARV as prophylaxis can reduce the risk of HIV transmission but cannot bring it to zero. The Brazilian Medical Board authorizes HIV sperm separation.⁷

The United Kingdom does not recommend unprotected intercourse in couples wishing to conceive safely, although this is recognized to be common practice in couples limited by geographical access and financial constraints to safer options such as sperm washing.⁸

Unprotected intercourse carries a 10%/year risk of HIV infection in heterosexual partners.⁹ Viral load in semen also affects risk but, paradoxically, correlates poorly with serum viral load. Although serum HIV levels in plasma are generally higher than those in the semen, virus has been detected in men with undetectable plasma viral levels.

In order to give HIV serodiscordant safe options to conceive their biologically related child, insemination is offered in some settings as an option to achieve their objective.

The advantage of the stimulated cycle is that pregnancy can be achieved with fewer inseminations.¹⁰ Pregnancy rates were higher in this study comparing to regular patients submitted to intrauterine insemination (40% and 23.5%, respectively).² This difference could be due to the small sample size or because we are not dealing, in this study, with a truly infertile couple. Also, to submit wives to a complete fertility work up avoids multiple tries and increase chances to achieve pregnancy.

In conclusion, with all advances in the HIV field, couples will face the natural desire to conceive their own child. Sperm washing and intrauterine insemination are safe options to HIV serodiscordant couples and can be offered with a high chance of achieving pregnancy. In our series, no HIV transmission occurred.

ACKNOWLEDGEMENTS

Authors would like to thank Clovis Arns da Cunha and Maria Inez Kuchiki for their collaboration.

REFERENCES

1. Human immunodeficiency virus and infertility treatment. American Society for Reproductive Medicine, Published by Elsevier Inc. Fertility and Sterility 2010, vol. 94, n. 1, June.
2. Semprini AE, Levi-Setti P, Ravizza M et al. Insemination of HIV-negative women with processed semen of HIV-positive partners. *Lancet* 1992; 340:1317-19.
3. Schuffner A, Poletto RS, Placido T. Intrauterine insemination: a realistic alternative in assisted reproduction. *Reprod Clim* 2009; 24:18-22.
4. Sauer MV. Sperm washing techniques address the fertility needs of HIV-seropositive men: a clinical review. *Reprod Biomed Online* 2005; 10(1):135-40.
5. Mark HY, Heather MS, Mona RL. Access to infertility services in Canada for HIV-positive individuals and couples: a cross-sectional study. *Reproductive Health* 2010; 7:7.
6. Recomendações para terapia antirretroviral em adultos infectados pelo HIV- 2008 - Suplemento III - Tratamento e prevenção. Brasília, outubro de 2010. Accessed at: <http://www.aids.gov.br/publicacao/nota-tecnica-2842010>.
7. Implicações éticas quanto às técnicas de reprodução assistida em casais sorodiscordantes para HIV, onde a mulher é soronegativa e o homem é soropositivo". *Arq Cons Reg Med do PR* 2004; 21(82):74-6.
8. BHIVA Guidelines Writing Committee. Guidelines for the management of HIV infection in pregnant women and the prevention of mother-to-child transmission of HIV. *HIV Med* 2005; 6(S2):107-48.
9. Townsend L, Johnston LG, Flisher AJ et al. Effectiveness of respondent-driven sampling to recruit high risk heterosexual men who have multiple female sexual partners: differences in HIV prevalence and sexual risk behaviours measured at two time points. *AIDS Behav* 2010; 14(6):1330-9.
10. Semprini AE, Ravizza M, Muggiasca ML et al. Paternal HIV infection and transfer of HIV from mother to fetus. *Br Med J* 1994; 308:453.