

FIRST CASE OF HIV WINDOW DONATION IN SWITZERLAND AFTER 8 YEARS OF UNIVERSAL HIV NAT SCREENING

J. Gottschalk¹, Y. Achermann², C. Niederhauser³, C. Tinguely³, A. Glauser¹, P. Lodemann¹, B.M. Frey¹

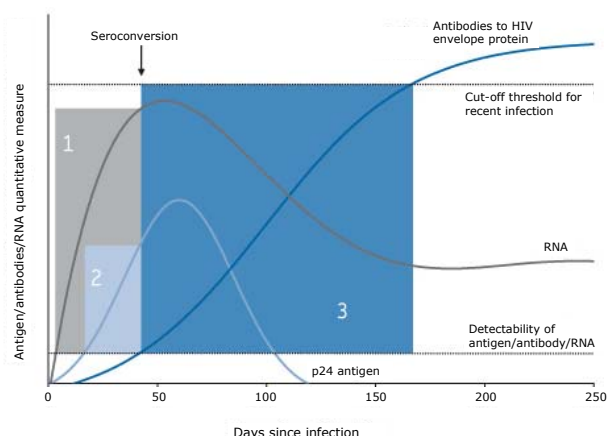
¹Blutspende Zürich, Rütistrasse 19, 8952 Schlieren
²University of Zurich, Division of Infectious Diseases and Hospital Epidemiology
³Blood Transfusion Service SRC, Berne
www.blutspendezurich.ch



Introduction and Purpose

Transfusion-associated HIV transmission is a rare but dreaded event. About 350'000 donations are annually screened for human-immunodeficiency virus (HIV) in Switzerland. Anti-HIV antibody screening by ELISA testing may fail in early infection because of a diagnostic window-phase of about 21 days. Therefore, blood donations in Switzerland are screened for HIV by nucleic acid test (NAT) since 2002. The diagnostic window phase for HIV will be diminished by NAT-screening. At an average the remaining time period accounts for 5 to 6 days. The adjacent figure shows the kinetics of virological markers and the host immune response in the early phase of HIV infection. The p24-antigen will be detected about 14 days after infection, as can be inferred from the graph.

Kinetics of virological markers and host immune response used to define transient states in the early phase of HIV infection



Le Vu S., et al., Principles and uses of HIV incidence estimation – a review. Euro Surveill. 2008;13(36):pii=18969

Materials and Methods

Since 2002, Swiss blood donors were screened by law for HIV infections with NAT screening. From 2002 to 2007, Cobas Amplicor/HIV-1 Ampliscreen/Roche was used by all six screening centers in Switzerland. Since 2009 transcription mediated amplification (TMA) (Procleix TIGRIS®/Novartis Diagnostics) in one center and real time RT-PCR (Cobas s201®/TaqScreen/Roche) by the other centers are applied. Positive screening findings from molecular and/or antibody screening are confirmed by real time PCR (Abbott RealTime HIV-1 Assay), EIA (MEIA AxSYM, Abbott Diagnostics), p24 antigen test (Genscreen HIV-1 Ag EIA, Bio-Rad Laboratories) and Immunoblot (INNO-LIA HIV1/2 gO, Innogenetics) by the Reference Laboratory of Swiss Blood Transfusion Service SRC.

Results

Since 2002, of around 3'100'000 blood donations, the first donor was found positive for window-HIV infection and will be described hereby. The propositus, who was regular blood donor since years, got a negative HIV-test (antibody/antigen and PCR) at private doctor's office two days before blood donation. The index donation was found HIV RNA positive applying both NAT screening platforms. A HIV viral load of 72 geq/ml was detected. Ten days later the second blood drawing revealed a viral load of 260'000 geq/ml. The p24-Antigen-test was positive on this second drawing and antibody ELISA still remained negative. Acute HIV infection was confirmed by positive HIV antibodies (ELISA and Immunoblot) on a third drawing four weeks after index donation. The progression of HIV revealed 710'000 geq/ml. Confronted with this results, the patient conceded to be homosexual. All laboratory results are given in the adjacent table. Based on this single observation, the incidence of HIV positive window donation in Switzerland is estimated of 1:3'100'000 donations which corresponds to the frequency observed in Central European countries. Given this low event frequency, the overall costs to prevent the transmission of one life-threatening HIV infection to the recipient of blood products adds up to about 53'000'000 SFR (38'000'000 €), provided that in average 1.3 products are manufactured out of one blood donation.

Laboratory analysis	Date of blood drawing (2010)			
	28.04.	30.04.*	10.05.	02.06.
HIV-PCR	neg			
HIV-Combotest	neg			
Ezygnost HIV-Integral II, Siemens		neg	pos	
Cobas s-201, MPX-PCR, Roche Diagnostic Systems		pos	pos	
Anti-HIV-1/-2 MEIA, AxSYM, Abbott		neg	neg	
Genscreen HIV-1 Antigen (p24), EIA, Bio-Rad		neg	pos	
INNO-LIA HIV-1/2/gO, Immunoblot, Innogenetics		neg	neg	
Tigris, Procleix Ultrio assay, HIV-1, Chiron		pos	pos	
Abbott realtime HIV-1 assay, geq/ml		72	260'000	
HIV-1 Antigen (p24)				pos
HIV-1 Antigen (p24), quantitative (ng/l)				pos (39.7)
HIV-1 RNS, PCR, quantitative, geq/ml				710'000
INNO-LIA HIV-1, Immunoblot, Innogenetics				pos
INNO-LIA HIV-2, Immunoblot, Innogenetics				neg
CD4 Lymphocytes, normal range cells/µl: 300-1140				326
CD4 Lymphocytes, normal range: 33% - 63%				23
CD8 Lymphocytes normal range cells/µl: 140 -830				854
CD8 Lymphocytes, normal range: 12% - 39%				61
CD4/CD8 ratio, normal range: 1.0 - 5.0				0.4

Laboratory analysis was done by
ANALYTIKA, Medizinische Laboratorien, Zurich
BLUTSPENDEZÜRICH, Schlieren
Blood Transfusion Service SRC, Berne
University of Zurich, clinic for immunology

* Date of blood donation

Conclusion

Despite low incidence of HIV infected blood donors in Switzerland, this observation confirms the occurrence of window-HIV infections in our blood donor community, detectable only by most modern NAT screening technology. Although general NAT screening adds gigantic costs to the health system, the presented case assures effectiveness of current donor screening in Switzerland.