A NAT ONLY HBV POSITIVE DONATION: BREAKTHROUGH SUBCLINICAL INFECTION IN A HBV VACCINATED BLOOD DONOR

J. Gottschalk, A. Glauser, K. Hardegger, B.M. Frey

Blutspende Zürich, Rütistrasse 19, 8952 Schlieren
www.blutspendezurich.ch

BLUTSPENDE ZÜRICH

Background

Since the introduction of nucleic acid testing (NAT) for Hepatitis B Virus (HBV) in blood donations, sporadic NAT-only HBV positive donations have been emerged. In general HBV NAT-only positive donations will be seen as window phase or as occult infection donations.

Aims

A NAT-only HBV positive donation will be presented, which derives possibly from a breakthrough subclinical infection in a HBV vaccinated blood donor. This case raises some questions about HBV immunity of vaccinated donors and of infectiousness of its blood products.

Materials and Methods

Initial NAT-Screening for blood donors was performed in pools of six with the cobas s201/TaqScreen MPX test (Roche Diagnostics), a multiplex nucleic acid test. Resolution of positive pools was accomplished by single donation re-testing. In reactive samples, the individual reactive parameters have to be identified using alternative testing in the Reference Laboratory of Swiss Blood Transfusion Service SRC. HBV DNA from EDTA-Plasma of the donor and her partner were amplified after ultracentrifugation of EDTA-plasma in the Institute or Medical Virology, Justus Liebig University, Giessen, Germany.

Results

The index donation was repeatable positive by the cobas TaqScreen MPX test but negative with all serological assays including anti HBc and anti HBs. Confirmation by the Abbott Real Time HBV assay showed equivocal results with a very low HBV viral titer of 4 IU/ml. Follow up testing two weeks later showed still negative results for HBsAg and anti HBc. Interestingly, HBV DNA could not be detected anymore and anti HBs had increased to > 1000 mIU/ml. This finding was confirmed in another follow up sample 3 months after the index donation with negative results for all but the parameter antiHBs, which remained on a high level. Comparative analysis of HBV DNA sequences derived from the donor and her partner showed identity. Genotyping resulted in genotype C1 (adr).

Laboratory analysis	Date of blood drawing				
	30.03.2011 Index donation	12.04.2011 Follow up sample 1	16.06.2011 Follow up sample 2	08.08.2011 Follow up sample 3	20.01.2012 Follow up sample 4
Hepanostika HBsAg Ultra, BioMérieux	neg	neg	-	neg	neg
Enzygnost® Anti-HBc monoclonal, Siemens	neg[1]	neg	neg	-	neg
Enzygnost® Anti-HBs II, Siemens	neg[1]	>220 mIU/ml	>190 mIU/ml	-	>270 mIU/ml
Cobas s-201, MPX-PCR, Roche Diagnostic Systems	pos[2]	neg	neg[3]	neg	neg
AUSAB (Anti-HBs), AxSYM, Abbott	-	>1000 mIU/ml	-	-	-
Core (Anti-HBc), AxSYM, Abbott	neg[1]	neg	-	-	-
HBsAg V2, AxSYM, Abbott	neg[1]	neg	-	-	-
RealTime HBV assay, Abbott	equivocal (4 IU/ml)[1]	neg	-	-	-

Conclusion

These findings suggest a breakthrough subclinical infection of the HBV vaccinated donor, which might have been acquired very shortly before the blood donation. Two findings strongly suggest acquisition of the infection by the donor from her partner. The first point is the identity of HBV DNA sequences derived from the donor and her partner. The second point is the finding of genotype C1 (adr), which is common in Southeast Asia. The strongly boosted anti HBs might have cleared the virus very rapidly from the plasma. An anti HBc seroconversion would be expected.