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

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Objectives: 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 positive donations will be seen as window phase or as occult infection donations. A NAT-only HBV positive donation will be presented, which possibly derives from a breakthrough subclinical infection in a HBV vaccinated blood donor.
Methods: The cobas s201/TaqScreen MPX test (Roche Diagnostics), a multiplex nucleic acid test for blood screening, was implemented at the ZURICH Blood Transfusion Service SRC in April 2008. Routine samples were tested in pools of six. Resolution of positive pools was performed by single donation re-testing. In reactive samples, the individual reactive parameters have to be identified using alternative testing. This was done by the Reference Laboratory of Swiss Blood Transfusion Service SRC
Results: Since 2008, more than 320'000 donations have been screened for HBV DNA. Three donations have been found to be HBV NAT only positive (negative for HBsAg by conventional ELISA screening). One such donation derives from a HBV vaccinated blood donor. 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 Abbot Real Time HBV assay showed equivocal results with a very low HBV viral titer of 4 IU/ml. Follow up testing two weeks later still showed 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 anti-HBs, which remained on a high level.
Conclusion: These findings suggest a breakthrough subclinical infection of the HBV vaccinated donor, which might have been acquired very shortly before the blood donation. There are anamnestic indications that the partner of the donor is chronically infected by HBV. The strongly boostered anti-HBs might have cleared the virus very rapidly from the plasma. An anti-HBc seroconversion would be expected within the next months.
Outlook: If the chronic HBV infection of the partner can be confirmed, genotypes of both HBV clones shall be compared to prove the recent infection.
Furthermore, infectivity of the index donation could be checked in a transgenic mouse model.
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