Short reports

Hepatitis C virus seroconversion by a third generation ELISA screening test in blood donors

H I Atrah, M M Ahmed

Abstract

The significance of seroconversion as detected by an ELISA screening test for hepatitis C virus (HCV) antibody with a negative supplemental/confirmatory recombinant immunoblot assay (RIBA) result was investigated. Of 118 220 established West Midlands blood donors with at least one negative HCV antibody screen, 43 had seroconverted in 1994 according to the ELISA but had negative RIBA-3 results. The paired archive serum samples of the pre- and postseroconversion donations of 29 seroconverting donors were tested by nested polymerase chain reaction (PCR) for the detection of HCV RNA. All 58 samples were negative by PCR. The absence of detectable viraemia in all tested seroconverting donors suggests that HCV infection was not responsible for seroconversion by ELISA.

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Keywords: hepatitis C virus, ELISA, RIBA, PCR, blood donors, seroconversion.

Hepatitis C virus (HCV) antibody seroconversion in established blood donors has been described recently and classified into three distinct categories.¹ All seroconverting donors should have had, by definition, at least one negative HCV antibody screen (usually by ELISA) prior to seroconversion. Results of the supplemental/confirmatory testing by recombinant immunoblot assay (RIBA) determine the category of seroconversion. Thus, seroconverting donors can be positive, indeterminate or negative for HCV antibody by RIBA.

Seroconversion by ELISA and RIBA has been described in a small number of established blood donors. The index donation or the preceding donation of some such donors was positive for HCV RNA by the polymerase chain reaction (PCR). Seroconversion by ELISA and RIBA is, therefore, associated with the possibility of recent HCV infection. The significance of HCV antibody seroconversion by ELISA in association with an indeterminate RIBA result is still unknown, but is being actively investigated at this centre. A positive HCV antibody screen by ELISA with a negative RIBA result in previously untested donors is not associated with HCV viraemia² and is not

recognised as an indication for infection with HCV. The aim of this study was to investigate whether HCV antibody seroconversion by ELISA but with negative RIBA results in established blood donors carries the same significance of similar results in previously untested donors or whether it represents recent HCV infections with detectable viraemia (PCR positivity) but with incomplete immune responses.

Methods

A second generation ELISA test for HCV antibody (Ortho Diagnostics, High Wycombe, UK) was used in this centre to screen blood donor samples until July 1993. The RIBA-2 supplemental test (Ortho Diagnostics) was used to verify positive results of the screening test. In August 1993 the earlier screening and supplemental tests were replaced by Ortho Diagnostics' third generation ELISA test for HCV antibody and RIBA-3.

The records of the Virology Laboratory at the West Midlands Blood Transfusion Centre for 1994 were searched for blood donors repeatedly positive (a minimum of three of four tests) by the Ortho Diagnostics' third generation ELISA screening test for HCV antibody. The list of such donors was scrutinised to identify established donors who had donated blood before and were negative for HCV antibody in the ELISA screening test on a previous occasion(s). Laboratory and other data pertaining to the this group of donors were analysed with particular attention to their RIBA-3 results.

The archive serum samples of blood donors are stored at -40°C and retained for a period of 25 months. All available paired archive serum samples of the index and the pre-index donations of donors seroconverting by the third generation ELISA screening test for HCV antibody but negative by RIBA-3 were tested by nested PCR for the detection of HCV RNA.³

Results

In 1994, 149 730 individuals (73 929 men and 75 441 women) in the West Midlands gave 256 935 blood donations. The majority (118 220; 59 940 men and 58 280 women) were established donors with one or more previously negative ELISA HCV antibody screen result. During the same period, 71 blood don-

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ors (41 men and 30 women) tested positive by ELISA screening test for HCV antibody but negative by RIBA-3. The majority (43; 30 men and 13 women) of these donors were previously negative by ELISA; the rest (28; 11 men and 17 women) were new donors.

Of the 43 seroconverting donors by ELISA, 29 had at least one negative pre-seroconversion HCV antibody screen by the third generation ELISA. The pre-index donations of the remaining 14 donors were screened by the second generation ELISA test for HCV antibody prior to August 1993. The archive serum samples relating to these donations were not available for testing by PCR or retesting by third generation ELISA for HCV antibody.

The paired archive serum samples ($n=58$) of the index (positive by third generation ELISA and negative by RIBA-3 HCV antibody tests) as well as the pre-index (negative by third generation ELISA HCV antibody test) donations relating to the unselected group of 29 seroconverting donors were all negative by nested PCR for HCV RNA.

Discussion

We have reported that in 1993, 52 established blood donors seroconverted by the second or third generation ELISA screening test for HCV antibody with negative RIBA-2 or RIBA-3 results.¹ In this communication we report similar seroconversion in a further 43 blood donors.

It can be argued that seroconversion by ELISA screening test for HCV antibody may not be genuine if pre- and postseroconversion samples of the same donors were analysed using different tests or different generations of the same test. Any "drift" in reactivity due to test

enhancement may confound changes in test results.⁴ However, seroconversion by ELISA in an unselected group of 29 donors described in this report is not subject to this technical consideration, as pre- and postseroconversion samples were tested by the same third generation ELISA screening test for HCV antibody.

All 29 seroconverting donors by ELISA with negative RIBA-3 tests were negative for HCV RNA by PCR. The absence of viraemia in the pre- and postseroconversion samples of all donors does not exclude HCV infection but argues strongly against this possibility. It follows that HCV antibody seroconverting donors by ELISA with negative RIBA-3 results—as a group with distinct laboratory results—are perhaps no different from previously untested donors with identical serological results. The explanation for false positive ELISA results is linked with test non-specificity⁵; however, the reason for seroconversion by ELISA in donors previously negative for HCV antibody remains unknown.

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Microbiological and serological investigations of oral lesions in Papillon-Lefèvre syndrome

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Abstract

Microbiological and serological (enzyme linked immunosorbent assay) investigations were carried out, including karyotyping, on two Asian children with Papillon-Lefèvre syndrome. In case 1, a girl aged four years, the most prevalent putative periodontopathogens were *Eikenella corrodens*, *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *Prevotella intermedia* (deciduous dentition) and *Bacteroides gracilis*, *E. corrodens* and *F. nucleatum* (permanent

dentition). In case 2, a boy aged nine years, they were *F. nucleatum*, *P. intermedia* and *P. loeschii* and *E. corrodens*. Serum from case 2 showed a raised specific IgG antibody response to *Actinomyces actinomycetemcomitans* serotype b. Thus, a wider range of species than hitherto reported may be associated with Papillon-Lefèvre syndrome, including *A. actinomycetemcomitans* and *F. nucleatum*.

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