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Research Article

T-Cell Response to Hepatitis B Core Antigen: Identification of Prior Exposure to and Confirmatory Testing for Screening for Anti-HBc

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Background. During routine donor screening in the blood bank, it is not uncommon to find isolated reactivity for anti-HBc in the absence of detectable HBV DNA in a first donation but absence of reactivity to anti-HBc in subsequent donations, suggesting a false-positive result for anti-HBc. *Study Design and Methods.* The blood donor population was screened between January 2010 and October 2011. We selected 2,126 donations positive only for anti-HBc from a total of 125,068 donations. During the process, OBI donors were identified, and their HBcAg-specific T-cell response was analyzed and compared to donors with chronic (HBsAg positive) and recovered (anti-HBc only) infection. We analyzed correlations between signal levels (Co/s) in the competitive assay for anti-HBc and HBV DNA detection. *Results.* In the 21-month study period, 21 blood donors with anti-HBc alone were identified as OBI (1 in each 5955 donors). The relevant finding was the observation that anti-HBc only subjects with Co/s $\geq$ 0.1 did not have either HBcAg-specific T-cells or detectable HBV DNA and OBI subjects presented with Co/s $\leq$ 0.1 and HBcAg T-cell response. In the subset of 21 OBI subjects, 9 donors remained positive for HBcAg T-cell response after four collections. In all 9 samples, we observed HBV DNA fluctuation. *Conclusion.* Our data suggest that HBcAg-specific T-cell response could be used to confirm anti-HBc serological status, distinguishing previous exposure to Hepatitis B virus from anti-HBc false-positive results.

1. Introduction

Hepatitis B virus (HBV) infection is an important global health problem [1, 2] especially in Asia, Africa, Southern Europe, and Latin America [3]. About 2 billion people are infected with HBV worldwide [4–7], among them, 400 million suffer chronic HBV infection [5]. In Brazil, the HBsAg positivity ranges from 1.6% to 8.5%, corresponding to approximately 3 to 16 million infected individuals [8–13]. The residual HBV risk in screened blood transfusion ranges from 1 : 10,700 [14] to 1 : 62,734 [15] and is markedly higher compared to Europe [16], North America [17, 18], Australia [19], and Japan [20].

Further, the identification of blood donors with occult HBV infection (OBI) individuals negative for Hepatitis B antigen (HBsAg) with detectable circulating HBV DNA has created concern related to the safety of the blood supply [21, 22].

Hepatitis B virus continues to offer the greatest risk of transfusion-transmission infection despite HBsAg screening of blood donations. Residual risk of HBV transfusion-transmission results from occult HBV infection, window