

EVALUATION OF THE CONTRIBUTION OF THE VIRAL SERUM MARKER “ANTI-HBc” TO BLOOD SAFETY IN LEBANON BY POLYMERASE CHAIN REACTION

Al Haddad, Christian ¹ Finianos, Peter ² Matta, Stephanie ³ Zgheib, Eliane ⁴ Feghali, Rita ⁵ Germanos, Myrna ⁶ Lahoud, Jean-Claude ⁷

¹ Department of Laboratory Medicine and Blood Bank, Centre Hospitalier Universitaire Notre Dame des Secours (CHU-NDS), Byblos, Lebanon

^{1,2,3,4,6,7} Faculty of Medicine and Medical Sciences, Holy Spirit University of Kaslik (USEK), Jounieh, Lebanon

⁵ Department of Laboratory Medicine and Blood Bank, Rafic Hariri University Hospital (RHUH), Beirut, Lebanon

Introduction

- Lebanon is considered as a zone of low to moderate endemicity for the Hepatitis B virus with a prevalence of 1.74% (1), (2).
- Classical screening of blood units was based on HBsAg testing only.
- Since 2013, the Lebanese Ministry of Public Health and the Lebanese National Committee of Blood Transfusion (LNCBT) have recommended the testing of anti-HBc in the screening of blood units.

Objectives

- Evaluate, by PCR, the prevalence of HBV in a Lebanese donor population with negative HBsAg but positive anti-HBc (3).
- Provide justification for the usual practice of discarding blood units with such a serological profile especially in settings where PCR screening is not routinely available.

Methods

10,945 blood donors
(2013-2015)

224 samples with
HBsAg negative
anti-HBc positive

anti-HBs antibodies
measured in all 224
samples

Hepatitis B viral load
measured by PCR in 79
randomly selected
samples

- A retrospective study was conducted at the Centre Hospitalier Universitaire- Notre Dame des Secours (CHU-NDS), Byblos-Lebanon.
- A total of 10,945 blood donors that were screened for HBsAg and anti-HBc on an ARCHITECT (Abbott Diagnostics) between 2013 and 2015 were analyzed.
- 224 of these donors had a negative HBsAg but a positive anti-HBc and were selected as study samples.
- Anti-HBs antibodies were measured in all of these study samples on an ARCHITECT (Abbott Diagnostics).
- 79 samples were then randomly selected and hepatitis B viral loads were determined by PCR on a Cobas[®] Taqman[®] (Roche).

Results

- Anti-HBs antibodies were grouped into 3 categories based on their levels.
- Viral HBV DNA was detected in 2 of the 79 samples that were tested with PCR at a percentage of 2.53% (4).

Units with negative HBsAg and positive anti-HBc	Anti-HBs antibodies level (IU/L)	Number of samples	HBV DNA detected by PCR
	< 10	18	1
	10 – 1000	51	0
	> 1000	10	1
Total		79	2

Conclusion

- HBsAg alone is insufficient to determine the infectivity of donated blood units and to ensure transfusional security.
- Even in the absence of HBsAg, and probably regardless of the level of anti-HBs antibodies, HBV DNA may still be present and the blood unit may be contagious (5).
- In the absence of PCR, it is recommended to be overcautious and to discard all blood units with a positive anti-Hbc even though this may be a false positive.

The systematic blood screening of anti-HBc, in addition to HBsAg, decreases the risk of post-transfusion HBV transmission especially in settings and countries, such as Lebanon, where PCR is not routinely available due to economic reasons.

References:

- (1) Abou Rached, A., Abou Kheir, S., Saba, J., & Ammar, W. (2016). Epidemiology of hepatitis B and hepatitis C in Lebanon. *Arab J Gastroenterol*, 17(1), 29-33. doi:10.1016/j.ajg.2016.01.002
- (2) Baddoura, R., Haddad, C., & Germanos, M. (2002). Hepatitis B and C seroprevalence in the Lebanese population. *East Mediterr Health J*, 8(1), 150-156.
- (3) Ramia, S., Ramlawi, F., Kanaan, M., Klayme, S., & Naman, R. (2005). Frequency and significance of antibodies against hepatitis B core (anti-HBc) antigen as the only serological marker for hepatitis B infection in Lebanese blood donors. *Epidemiol Infect*, 133(4), 695-699.
- (4) Badrawi, H. and Bakry, R. (2013) Anti-HBc and HBV-DNA detection in blood donors negative for hepatitis B virus surface antigen. *American Journal of Molecular Biology*, 3, 62-66. doi: 10.4236/ajmb.2013.31008.
- (5) Behzad-Behbahani, A., Mafi-Nejad, A., Tabei, S. Z., Lankarani, K. B., Torab, A., & Moaddeb, A. (2006). Anti-HBc & HBV-DNA detection in blood donors negative for hepatitis B virus surface antigen in reducing risk of transfusion associated HBV infection. *Indian J Med Res*, 123(1), 37-42.