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Advancing Hepatitis B Virus Testing in Prospective Blood Donors Beyond Current Single Marker Rapid Technique: Is it a Luxury or Necessity?

ABSTRACT

Background: Blood transfusion comes with its various risks especially as it concerns transmission of blood-borne infections. Hepatitis B virus (HBV) screening is mandatory for certifying blood donors fit for donation. This study seeks to advance serologic and molecular diagnosis of HBV in prospective blood donors (PBD) beyond routine single-marker HBsAg screening.

Methods: Four hundred and seventy (470) PBD were screened for HBV markers between August, 2014 and November, 2015. Serologic screening for HBV markers; estimation of alanine aminotransferase (ALT) levels as well as confirmatory and viral load assays were performed on plasma samples separated from blood donors. First-line serologic assays were performed by rapid enzyme immunoassay techniques and subsequent HBsAg by ELISA technique. Confirmatory and quantification assays were performed with real-time PCR. ALT level was estimated spectrophotometrically. SPSS version 21 software was used to analyze data. $P < 0.05$ was statistically significant.

Results: Study showed that the overall mean age and gender ratio of PBD were 26.87 ± 7.51years and 1.45:1 respectively. Chi square analysis revealed that PBD had right knowledge of most of the routes of hepatitis B and C viral transmission (χ^2 range = 11.6 - 102.3, $p < 0.05$). HBsAg seroprevalence was 6.38% based on NOVA 5-in-1 rapid EIA compared to 7.02% based on ELISA technique. Cummulative HBV markers seroprevalence was 19.36% and the impact of age groups of PBD on it was statistically significant ($p < 0.002$). Comparison of serologic techniques using real-time PCR as the gold standard, and DOR showed that NOVA 5-in-1 HBV rapid EIA was nearly 7-fold better than ELISA technique (adjusted DOR: 53,740 compared to 7,625) for HBsAg detection. The mean HBV-DNA viral load and ALT of chronic inactive carriers of HBV were 1311.0 ± 1165.5 IU/mL and 15.5 ± 1.5 IU/L while those of chronic immune tolerant hepatitis B infected blood donors were 31313849.7 ± 5726513.5 IU/mL and 17.7 ± 1.2 respectively.

Conclusion: Combination of serologic and molecular analyses as well as estimation of ALT levels constitutes better diagnostic tools. The use of more stringent serologic techniques and workable algorithm to reduce risks associated with blood transfusion and enhance both blood donors' and recipients' safety is no longer a luxury but a necessity.

Key words: Transfusion, hepatitis, hepatocellular carcinoma, HBV, seroprevalence, enzyme immunoassay, vaccination, immunization.

Biography:

Fasakin Kolawole is a Chief Biomedical Scientist/ Researcher at Federal Teaching Hospital, Ido Ekiti, Nigeria with passionate interest in advances in diagnostic haematology, flowcytometry and viral hepatitis B and C, and human immunodeficiency virus. He is an Adjunct Lecturer at the Department of Medical Laboratory Science, Afe Babalola University, Ado Ekiti (ABUAD) for over five years and an examiner at different times for the First and second professional examinations of the Medical Laboratory Science Council of Nigeria at ABUAD. He was first PEPFAR-Supported ART Laboratory Manager at Federal Teaching Hospital, Ido Ekiti and have published eighteen articles of academic research findings in international journals. He is a reviewer for journal houses including SCIENCEDOMAIN International and the World Health Organization. He has attended several conferences and won awards of repute at both national and international levels on HIV/AIDS (including the Global health Travel Awards) and different aspects of laboratory haematology.