



Blood donor screening for Hepatitis B and C in Benghazi: additional tests are needed

ABSTRACT

Background: Traditionally prevention of transfusion-transmitted viral infections relies on screening blood donors using enzyme immunoassays (EIA). To further enhance blood safety some countries employ anti-HBc testing to detect HBsAg negative donors. Improving safety is further complemented by genome screening using nucleic acid amplified technology (NAT).

Aim of study: to determine whether there is a need to reform our strategy for blood donor screening.

Setting: The central laboratory at Al-Fateh Children Hospital and the laboratory of the Center of Immunology and Infectious Diseases.

Materials and Methods: Blood donations previously collected and screened in the central blood bank were re-tested in our laboratories by EIA for HIV, HCV, and HBsAg. In addition samples from the same units were tested for anti-HBc using EIA and for HCV using NAT.

Results: A total of 100 blood donations were tested. All were negative for HBsAg, HIV, and HCV using EIA techniques. Ten (10%) units were anti-HBc reactive and six (6%) units were HCV-NAT reactive.

Conclusion: Our results show that although all donations pass the traditional screening tests, using additional tests revealed that ten percent of them was potentially infectious for hepatitis B and another six percent was potentially infectious for hepatitis C. These findings clearly call for a genuine need to reform our policy for blood donor screening. Additional tests, namely the anti-HBc and nucleic acid amplification tests, need to be urgently introduced.

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Key words:

Hepatitis B, hepatitis C, anti-HBc, HCV-NAT, blood transfusion, blood screening.

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INTRODUCTION

Prevention of transfusion-transmitted infections such as human immunodeficiency virus (HIV), hepatitis C virus (HCV), and hepatitis B virus (HBV), traditionally relies on meticulous blood donor selection and serological screening using progressively more sensitive enzyme immunoassays (EIA). However, several studies have shown that hepatitis B surface antigen (HBsAg) negative, anti-hepatitis B core (anti-HBc) positive blood is capable of transmitting HBV when transfused (1,2). Therefore some countries employ anti-HBc testing to detect potentially infectious donors who lack detectable HBsAg (2). Improving blood safety is recently complemented by genome screening with nucleic acid amplification technology (NAT). Many developed countries have successfully introduced this technology for detection of HIV and HCV in donors with undetectable antibodies (3). In Benghazi Central Blood Bank (CBB) EIA techniques are used to screen blood donors for HIV, HCV, and HBV. We carried out this study to determine whether there is a real need for implementing additional tests, namely anti-HBc and NAT, to reduce the residual risk of hepatitis B and C transmission by blood products.

MATERIALS AND METHODS

Randomly chosen blood products, red cell concentrates and whole blood, which have been collected and screened at the CBB, then sent to our hospital for patients use were sampled for re-testing. All donations were tested for HIV 12+ and HCV antibodies, and HBsAg at our laboratory using EIA techniques as those employed by CBB (kits from BioMerieux- France for HIV and HBsAg, and Innogenetic- Ghent Belgium for HCV). In addition all donations were tested for Anti-HBc using competitive immunoassays (Bio-tec, UK). Samples from the same donations were then tested at the laboratory for the center of immunology diseases for HCV-NAT (reverse

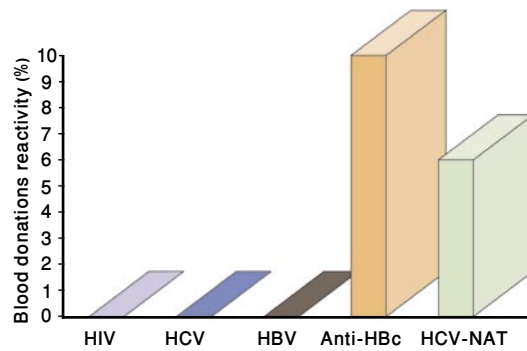


Figure 1: the reactivity of all tested blood donations using enzyme immunoassays and nucleic acid amplification technology.

*For abbreviations see text.

transcription-polymerase chain reaction, RT-PCR) using the COBAS Amplicor v 2.0 (Roche diagnostics). No data were available to us regarding donors' status or identity.

RESULTS

A total of 100 blood donations were tested. All donations tested negative for HIV, HCV, and HBsAg using EIA in agreement with the results obtained at the CBB. Of the 100 donations ten (10%) were reactive for anti-HBc while six (6%) donations were HCV-NAT reactive, see figure 1.

DISCUSSION

According to the World Health Organization (WHO) statistics 80% of the world's population has access to only 20% of the world's safe blood supply (4). In developing countries 50% of patients in whom a transfusion is indicated are at risk of dying immediately if transfusion is withheld (5). Therefore not to give blood, as an approach to guard against its hazards, is certainly not always a right option. It is estimated that in many developing countries about 40% of donated blood (13 million units) is not screened for all relevant transfusion-transmissible infections (6). It is also found that transfusion of unsafe blood accounts for

8-16 million HBV, 2.3-4.7 million HCV, and 80,000-160,000 HIV infections each year (7). This data clearly point to the fact that blood safety should be of major concern to health authorities everywhere. Furthermore, the issue of transfusion-transmitted diseases is particularly serious in countries with poor resources, poorly organized transfusion service, absence of cohesive national policy on blood safety, limited funding of health care, and poor infrastructure in terms of post, telephone, or rapid road transport which further limit the ability of blood transfusion center to recruit and recall voluntary donors to maintain a safe donor pool (4). To optimize blood safety the WHO recommends a centralized enzyme immunoassay screening policy (4) rather than patchy laboratories. Use of sensitive HBsAg assays coupled with anti-HBc testing has almost eliminated HBV transfusion transmission in many countries (8). Improving safety is recently complemented by genome screening using NAT (9). Our results show that although all donations pass the traditionally used EIA tests, using additional tests has detected donations that are potentially infectious for hepatitis B (10%), especially in immunosuppressed patients and other donations that are potentially infectious for hepatitis C (6%). We, therefore, conclude that there is an urgent need to reform our strategy for blood donor screening. Additional tests namely anti-HBc and nucleic acid amplified tests should be introduced in our blood donor screening program as soon as possible to optimize blood safety.

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