

## Screening for glucose-6-phosphate dehydrogenase deficiency in blood donors

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the most common red blood cell enzyme deficiency, affecting more than 400 million people worldwide.<sup>1</sup> The prevalence of G6PD deficiency in Iran is reportedly 3.5% to 11%.<sup>2-3</sup> Screening of our (mostly male) blood donors for G6PD deficiency is not performed routinely.<sup>4</sup> The aim of this study was to evaluate the frequency of G6PD deficiency in blood donors.

Blood samples were obtained from 706 randomly selected blood donors, who presented between June and September 2008. Enzyme activity was measured in triplicate by an automated analyzer (Chem Enzyme, Tehran, Iran). Deficiency was defined as an activity of less than 1.26 IU/g hemoglobin (Hb), 1 SD (2.8 IU/g Hb) below the mean (4.4 IU/g Hb).<sup>5</sup>

Based on this protocol, 16.3% of our donor population was classified as G6PD deficient. The prevalence of G6PD deficiency was higher in donors with a positive family history (34.8% vs. 15.7%, *p* value by Pearson chi-square, 0.02). As donors with a history of favism are deferred, the observed prevalence may be lower than that in the general population.

Is screening for G6PD deficiency in blood donors necessary or beneficial in an area of relatively high prevalence? One study of 23 patients who received 24 units of G6PD-deficient blood (G6PD A-) failed to reveal any deleterious effects and did not recommend routine screening for African-American donors, although additional data were felt to be necessary before reaching a similar conclusion about Caucasians in the United States (despite G6PD deficiency being found in only 0.5% of males with Greek and Italian surnames).<sup>5</sup> Nevertheless, the potentially severe consequences of a G6PD hemolytic crisis may argue in favor of routine G6PD screening of male blood donors in areas with high prevalence of G6PD deficiency.

### CONFLICT OF INTEREST

There is no conflict of interest.

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## Rubella vaccination and transitory false-positive test results for human immunodeficiency virus Type 1 in blood donors

A large immunization effort has been under way to accomplish the goal of the Pan American Health Organization of eliminating rubella by 2010, and 3 million people were immunized in São Paulo in 2008. In that year, our blood center in São Paulo, Brazil, experienced an unusual increase in the frequency of blood donors demonstrating falsely reactive tests for human immunodeficiency virus Type 1 (HIV-1). Many of these donations were from people who had recently received the rubella vaccine, and we sought to determine the relationship between rubella vaccination and this problem of false reactivity.

HIV-1 infection screening in Brazil is based on the detection of specific antibodies and involves a two-stage process beginning with an enzyme immunoassay (EIA) screening followed by a confirmatory test, Western blot assay (WB). Indeterminate results in WB have been found to be associated with a variety of medical conditions other than HIV and have been attributed to other retroviral infections, cross-reactivity between viral proteins, kit design, assay process, HLA (alloimmunization), and experimental vaccines.<sup>1-5</sup> We conducted a case-control study to assess the relation between rubella vaccination and false-positive testing for HIV.

A case donor was defined as a blood donor during the study period (from August 1, 2008, to October 31, 2008) that had repeatedly reactive EIAs (bioMérieux, Marcy

l'Etoile, France) and atypical indeterminate pattern WB (New Lav Blot I, Bio-Rad Laboratories, Manes-Coquette, France) to HIV-1 (reactivity to P55 or P31) on a single donated specimen. We identified 163 donations meeting this definition, but only 21 donors were included in this study because they had also donated before rubella vaccination and the effect of rubella seroconversion could be assessed. One-hundred control donors, randomly selected from contemporaneous blood donors, were seronegative for all viral tests. We matched case donors with control donors by sex, age, and date of donation. The serology laboratory had a serum library with frozen ( $-70^{\circ}\text{C}$ ) serum samples of prospective donors from the same period as the study who had been deferred. We analyzed risk factors from this population for correlation with false positivity to HIV as well. These risk factors included other vaccination, at-risk sexual relationships, use of prescription medications and intravenous (IV) drugs, allergies, and history of chronic illness obtained via the standard blood donation health history assessment. The mean age in both studied groups was 31 years (range, 19-43 years); 47% were male and 25% were repeat donors. Univariate analysis showed that 100% of the cases compared with 30.0% of controls reported a recent rubella vaccination (matched odds ratio [OR], 3.9; 95% confidence interval [CI], 38.1-114.7). In comparing the cases and controls, recent rubella vaccine was significantly associated with HIV false positivity ( $p < 0.001$ ), as was an at-risk sexual relationship ( $p < 0.05$ ), IV drug use ( $p < 0.05$ ), history of recent acute illness ( $p < 0.05$ ), and history of allergies ( $p < 0.05$ ) among deferred donors, as might have been expected. The use of prescription medications and other vaccinations was not correlated with HIV false positivity.

Additional testing was performed on all case donor samples and on additional samples obtained later. We analyzed frozen serum samples from serum library from blood donors before rubella vaccination (A), from the false-positive donation (B), and 5 weeks after donation (C). All samples (A, B, and C) were negative for HIV by reverse transcription-polymerase chain reaction (DNA Tecnologia do Brazil, São Paulo, Brazil). Rubella antibodies were also determined by commercial assay (BioMérieux, Boxtel, the Netherlands). Samples from the case donors demonstrated immunoglobulin G (IgG) seroconversion to rubella with low-avidity IgG rubella antibodies demonstrable in the B samples. No IgM rubella antibodies were identified. HIV EIA testing of the C samples demonstrated HIV seronegativity.

Our data showed that rubella vaccination was associated with transitory false-positive EIA reactivity for HIV-1

antibodies. Temporary deferral after rubella vaccination may be advisable to avoid the loss of a unit and the confusion caused by this false positivity. Plans for mass vaccination campaigns in adults should include consideration regarding blood donor availability during the corresponding deferral period. The potential for this cause of false positivity should be considered when an indeterminate WB pattern is encountered in a blood donor. Nucleic acid testing on the donation and on a follow-up sample may be helpful in distinguishing truly infected donors.

#### CONFLICT OF INTEREST

The author has no conflict of interest to disclose.

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