

Original article

Seroprevalency of transfusion-transmitted infections in first-time volunteer and replacement donors in Tunisia

Séroprévalence des infections transmissibles par transfusion chez les donneurs de sang volontaires et de compensation en Tunisie

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Available online 11 November 2014

Abstract

Background. – Replacement donors are considered as having a major risk of transmission of infections to recipients mainly by the World Health Organisation.

Study design and methods. – Seroprevalency of HBV, HCV, HIV and syphilis were determined in 19,783 whole blood donations collected in the Tunisian National Blood Transfusion Centre during the year 2010 (12,968 [65.55%] replacement donations and 6815 [34.44%] voluntary blood donations). For HBV, HCV and syphilis, we performed a univariate analysis to determine whether age, sex and type of donation were risk factors, then multivariate logistic regression, to see if these factors were independent.

Results. – Mean age of donors was 30.1 years (replacement donors 34.5 years, first time non-remunerated donors 34.5 years, $P < 0.001$). The predominant age group was 30–39 years (35.51%) in replacement donors and 20–29 years (54.15%) in first time non-remunerated donors. Male gender was significantly predominant (73.00% men vs 27.00% women, $P < 10^{-6}$). There were significantly more men among replacement donors (82.27% vs 55.38%, $P < 10^{-3}$). There were more women in the age groups 18–19 and 20–29 years. Only one HIV seropositive donation was noted in a male first time non-remunerated donor aged 18. Replacement type of donation, male sex and age were three independent risk factors for the HBs Ag carriage. For anti-HCV antibodies and TPHA, only replacement type of donation and age were found out to be risk factors and only age was independent.

Conclusion. – In Tunisia, replacement blood donors were at higher risk of infection transmission, but only for hepatitis B.

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Keywords: Blood donors; Volunteer donors; Replacement donors; Transfusion-transmitted disease; Hepatitis; HIV; Syphilis

Résumé

But de l'étude. – Les donneurs de compensation sont considérés à plus haut risque de transmission d'infections notamment par l'Organisation mondiale de la santé.

Sujets et méthodes. – Les séroprévalences de l'HBV, l'HCV, le VIH et la syphilis ont été déterminées chez 19 783 dons de sang total, collectés au Centre national de transfusion sanguine durant l'année 2010 (12 968 [65,55 %] dons de compensation et 6815 [34,44 %] dons volontaires). Pour l'HBV, l'HCV et la syphilis, on a effectué une analyse univariée pour déterminer si l'âge, le sexe et le type de don étaient des facteurs de risque suivie d'une étude multivariée en régression logistique pour voir si ces facteurs étaient indépendants.

Résultats. – L'âge moyen des donneurs était de 30,1 ans (donneurs de compensation 34,5 ans, donneurs volontaires 34,5 ans, $p < 0,001$). Le groupe d'âge prédominant était 30–39 ans (35,51 %) chez les donneurs de compensation et 20–29 ans (54,15 %) chez les donneurs volontaires. Le sexe masculin était significativement prédominant (73,00 % hommes vs 27,00 % femmes, $p < 10^{-6}$). Il y avait significativement plus d'hommes parmi les donneurs de compensation (82,27 % vs 55,38 %, $p < 10^{-3}$). Les femmes étaient plus nombreuses dans les groupes d'âge 18–19 et 20–29 ans. Un

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seul don VIH positif a été noté chez un donneur volontaire, un homme âgé de 18 ans. Le type don de compensation, le sexe masculin et l'âge étaient trois facteurs de risque indépendants de portage de l'Ag HBs. Pour les anticorps anti-HCV et le TPHA, uniquement le type don de compensation et l'âge étaient des facteurs de risque et seul l'âge était indépendant.

Conclusion. – En Tunisie, les donneurs de compensation étaient à risque plus élevé uniquement pour l'hépatite virale B.

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Mots clés : Donneurs de sang ; Donneurs volontaires ; Donneurs de compensation ; Infections transmises par transfusion ; Hépatite ; VIH ; Syphilis

1. Abbreviations

RD replacement donors
FTNRD first time non-remunerated donor
CNTS National center of blood transfusion
WHO World Health Organisation

2. Introduction

Blood transfusion is a crucial therapeutic means in every health system. Satisfying the needs of blood products and ensuring blood safety, especially infectious safety, remain major challenges for blood transfusion establishments.

In Tunisia, like in many other countries, we still rely on family or replacement blood donors (RD), family members or friends, who donate blood to replace the one that has been transfused to a relative. They contribute seriously to the blood supply in this country as they represent 60% of blood donors. The World Health Organisation (WHO) recommends excluding this type of blood donors as they present a major risk of transmitting infections [1].

In order to check this data, we determined the seroprevalence of HBV, HCV, HIV and syphilis in replacement and first time non-remunerated (FTNRD) Tunisian blood donors; then, we conducted a statistical study to see if age and sex were involved with any significant difference between the two types of donors.

3. Materials and methods

3.1. Study design and population

It is a retrospective study including 19,783 whole blood donations collected in the Tunisian national blood transfusion centre (CNTS) during the year 2010. A total of 12,968 (65.55%) replacement blood donations collected between January and June 2010 at fixed site at the CNTS and 6815 (34.44%) voluntary blood donations collected between January and December 2010 at mobile collections from first time non-remunerated donors (FTNRD) (27,789 blood donations provided by donors having donated earlier have been excluded from the study).

Age, sex and results of screening tests for HBV, HCV, HIV and syphilis were collected from the centre written records.

3.2. Infectious disease testing

Tests for serological markers of the viral agents were performed by commercial kits:

- monolisa HBs Ag ULTRA (BIO-RAD, France) for the detection of the hepatitis B surface antigen (HBs Ag);
- HCV Murex Ag/Ab combination (Abbot Murex), detecting hepatitis C virus antibody (anti-HCV) and the capsid antigen;
- genscreen ULTRA HIV Ag-Ab Assay (BIO-RAD, France), detecting the p24 antigen and antibodies for HIV-1 and HIV-2.

Syphilitic antibodies were screened by the Treponema pallidum hemagglutination assay (TPHA Biomaghreb).

3.3. Statistical analysis

Prevalencies were calculated for 100 donors with the EpiTable program of the EPI INFO software Version 6.04 d. with confidence intervals at 95% of confidence (Fleiss quadratic method). The search for carriage risk factors was performed using SPSS for Windows version 11.5 in univariate analysis and in multivariate analysis.

Risk factors searched for were: type of donor (replacement/FTNRD), gender of donor (male/female), age of donor (classified in four age groups: 18–19, 20–29, 30–39, ≥ 40 years).

For the univariate study, we calculated the odds ratio (for the age groups, the lowest odds ratio was considered as reference) and then we conducted a multivariate logistic regression using backward stepwise method. Multivariate analysis identified factors related independently of others to carriage.

The significance level for all comparisons was set at 0.05.

4. Results

4.1. Demographic characteristics of blood donors

Mean age of all the donors was 30.1 years. Replacement donors were significantly older than FTNRD (mean age: RD 34.5 years, FTNRD 27.7 years, $P < 0.001$), the predominant age group was 30–39 years (35.51%) followed by 20–29 years (33.71%) in RD and 20–29 years (54.15%) followed by 18–19 (39.14%) years in FTNRD (Fig. 1).

In all blood donors, male gender was significantly predominant (73.00% men vs 27.00% women, $P < 10^{-6}$). There was significantly more men among RD than among FTNRD (82.27% men in RD vs 55.38% men in FTNRD, $P < 10^{-3}$).

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