Disponible en ligne sur ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

TRANSFUSION CLINIQUE ET BIOLOGIQUE

Transfusion Clinique et Biologique 22 (2015) 312–317

Original article

First-time whole blood donation: A critical step for donor safety and retention on first three donations

Le premier don de sang : une étape critique pour la sécurité du donneur et sa fidélisation lors des trois premiers dons

P. Gillet [a,*], A. Rapaille [a], A. Benoît [b], M. Ceinos [b], O. Bertrand [a], I. de Bouyalsky [a], B. Govaerts [b], M. Lambermont [a]

[a] *Service du sang, Croix-Rouge de Belgique, Namur, Belgium*
[b] *Institut de statistique, biostatistique et sciences actuarielles, université catholique de Louvain, Louvain-La-Neuve, Belgium*

Available online 23 October 2015

Abstract

Aim of the study. – Whole blood donation is generally safe although vasovagal reactions can occur (approximately 1%). Risk factors are well known and prevention measures are shown as efficient. This study evaluates the impact of the donor's retention in relation to the occurrence of vasovagal reaction for the first three blood donations.
Material and methods. – Our study of data collected over three years evaluated the impact of classical risk factors and provided a model including the best combination of covariates predicting VVR. The impact of a reaction at first donation on return rate and complication until the third donation was evaluated.
Results. – Our data (523,471 donations) confirmed the classical risk factors (gender, age, donor status and relative blood volume). After stepwise variable selection, donor status, relative blood volume and their interaction were the only remaining covariates in the model. Of 33,279 first-time donors monitored over a period of at least 15 months, the first three donations were followed. Data emphasised the impact of complication at first donation. The return rate for a second donation was reduced and the risk of vasovagal reaction was increased at least until the third donation.
Conclusion. – First-time donation is a crucial step in the donors' career. Donors who experienced a reaction at their first donation have a lower return rate for a second donation and a higher risk of vasovagal reaction at least until the third donation. Prevention measures have to be processed to improve donor retention and provide blood banks with adequate blood supply.

Keywords: Blood donors; Vasovagal reaction; Risk factors; Donors' retention

Résumé

But de l'étude. – Le don de sang est sûr, même si des réactions vasovagales sont parfois observées (environ 1 %). Les facteurs de risque sont connus et des mesures préventives sont décrites. L'étude évalue l'impact d'une réaction vasovagale au premier don sur la rétention et la tolérance lors des trois premiers dons.
Matériel et méthode. – Les données collectées pendant trois ans permettent d'évaluer l'impact des facteurs de risque et fournissent un modèle intégrant la meilleure combinaison des variables prédictives de réaction vasovagale. L'impact d'une réaction au premier don sur le taux de retour et sur le risque de complication lors des trois premiers dons est évalué.
Résultats. – Les données (523 471 dons) confirment les facteurs de risque connus (sexe, âge, statut du donneur et volume sanguin relatif). Après analyse sélective des variables, le statut du donneur, le volume sanguin relatif et leur interaction restent les seules variables du modèle. Les trois premiers dons sont analysés chez 33 279 primo-donneurs avec un suivi de minimum 15 mois. Les données soulignent l'impact d'une réaction au premier don. Le taux de retour au deuxième don est réduit et le risque d'une réaction est augmenté au moins jusqu'au troisième.

* Corresponding author. Service du sang, Croix-Rouge de Belgique, 8, rue Fond-du-Maréchal, 5020 Suarlée, Belgium.
E-mail address: philippe.gillet@croix-rouge.be (P. Gillet).

http://dx.doi.org/10.1016/j.tracli.2015.09.002
1246-7820/

Conclusion. – Le premier don est une étape critique dans la carrière du donneur. Une réaction vasovagale au premier don réduit le taux de retour pour un deuxième don et augmente le risque de réaction au moins jusqu'au troisième. Des mesures préventives doivent être appliquées pour améliorer la rétention et contribuer à un approvisionnement adéquat des banques de sang.

Mots clés : Donneurs de sang ; Réaction vasovagale ; Facteurs de risque ; Rétention des donneurs

1. Introduction

Reducing the occurrence of donors' complications associated with blood donation and avoiding blood components shortages are ambitious challenges for all blood transfusion establishments (BTE).

BTE implemented policies to improve the safety of both recipients and donors. Complications related to whole blood donations (WBD) are classified as local (caused by the insertion of the needle) or general (mainly vasovagal reactions [VVR]) [1] and may lead to blood components shortages for several reasons. Firstly, WBD is sometimes interrupted and results in unsuccessful donation [2], and secondly adverse reactions may affect donor return for a further donation, especially if the donor is male [3]. WBD is generally safe, however, the percentage of complications is evaluated at around 1% of WBD [4] and varies among different countries and studies [5–7]. The reporting is higher when the information is explicitly solicited from donors [8,9].

Typical factors associated with VVR are well known [5,10]: gender (female), age (young), donor status (first-time vs. repeat donors) and estimated blood volume (less than 3500 mL). Although VVR are only partially due to blood loss [7], various measures are recommended to improve donation safety such as liquid administration (particularly rich-electrolyte drinking) [11,12], adequate collected blood volume [13] and applied muscle tension (AMT) [11,14].

Other prevention measures are relevant to the decrease in complications related to WBD such as special training of qualified professional health personnel to detect VVR symptoms and to assist donors in the event of complications [15,16].

Psychological factors, especially fear, play an important role in tolerance to WBD especially in young blood donors and specific measures have been investigated [17].

Previous studies have shown that the return rate for a second donation depends on the occurrence of donation complications (VVR) among first-time donors [9,18–21].

The aim of our study was firstly to evaluate the risk factors associated with VVR in our whole blood donor population and secondly to analyse donor retention in relation to the occurrence of VVR for the first three WBD.

2. Material and methods

The study includes all WBD from January 2010 to December 2012 collected either in fixed or mobile units. All blood donors who give whole blood for the first time are called first-time donors and repeat donors from the second donation on, regardless of the delay between donations.

All donor complications (local or general) were recorded; however, only VVR, independently of their severity were included in our study database and analysed. A VVR is defined as "a general feeling of discomfort and weakness with anxiety, dizziness and nausea, which may progress to loss of consciousness (fainting)" [1].

The following data were recorded for each donation in our database using the eProgesa® software (MAK systems, Paris, France): gender, date of birth, height and weight, donor status, collected blood volume, presence or absence of complications, type of complications. Some data were calculated on the basis of the recorded data: age, estimated blood volume (EBV, ICSH formula [22]), relative blood volume (RBV) defined as blood volume collected divided by the EBV. A RBV of 13% is the current limit defined in Belgian law.

Non-valid data were excluded: those for which values of specific parameters (age, gender, weight, height, blood collection volume) were not available or inconsistent.

For analysis of donor retention, only first-time donors with a follow-up of minimum 15 months were included.

Return rates are calculated as follow: *return rate* $i = N_i/N_{i-1}$ with N_i = number of donors at donation i and N_{i-1} = number of donors at donation i-1 ($i = \{1,\ldots,7\}$).

2.1. Statistical analysis

Odds ratios (OR) (with 95% CI) aimed at quantifying individual effects of gender, age, donor status and RBV on VVR were computed. A logistic regression model was used to simultaneously assess the effect of covariates (donor status, RBV, age, weight, gender and their interactions) on the occurrence of VVR. A manual backward stepwise selection based on the Bayesian information criterion was performed to determine the best combination of covariates to predict VVR.

The delay between repeated donations was calculated and differences among groups tested by non-parametric Mann-Whitney tests. Donor retentions were compared using a Chi-square test. Probabilities of VVR were compared with exact Fisher tests and quantified through odds ratios. The Bonferroni correction was used to adjust all P-values for multiple testing. Statistical analyses were performed using the SAS (SAS Institute Inc., Cary, NC, USA) and R software (R Foundation for Statistical Computing, Vienna, Austria).