

ADVERSE REACTIONS TO BLOOD DONATION

Dr. B. Abhishekh, Dr. Mayadevi. S, Dr. K. C. Usha

¹Assistant professor in Immunohematology, Memorial Institute of Oncology, M.H.Marigowda Road, Bangalore, India

²Department of Transfusion Medicine, Government Medical College, Thiruvananthapuram, India

ARTICLE INFO

Corresponding Author:

Amudha Govindarajan
Department of Anatomy, PSG
Institute of Medical Sciences and
Research, India

Key words: Blood donation,
syncope, vasovagal reactions

ABSTRACT

Aims & objectives: To describe the various adverse reactions and determine the frequency of their occurrence in whole blood donors.

Materials & Methods: Whole blood donors who donated in the Department (27253) & in camps (466) of the Dept. of Transfusion medicine, Government medical college, Thiruvananthapuram during the period January 2009 to December 2009 were the subjects under study. Donors were accepted for donation after screening & certified to be fit by the Medical officer. Blood was collected in standard 350ml blood bags. The donors were observed for any adverse reactions during or following donation

Results: Out of the total 27719 donors observed, 564(2.04%) had an adverse reaction of which 319(1.15%) were vasovagal related and 245(0.88%) were needle injuries.

Discussion: The risk of complications related to blood donation is low. However, attention towards donor complications is warranted, as it would have detrimental effects on return of donors for subsequent donations and rate of complications resulting in long-term morbidity and disablement is not negligible.

©2013, IJMHS, All Right Reserved

INTRODUCTION

Untoward reactions occur in around 1% of blood donations. By far the most frequent type of reaction is a simple faint [syncope]. Fainting is more common in woman, first time donors etc. Studies have shown that donor reactions are associated with lower donor return. They cause discomfort, anxiety, embarrassment to the donors. Donors with syncope have 10-15% probability of sustaining an injury during fall. So lessening of these reactions is also beneficial in that diversion of collection staff attention decreases, preventing decrease in productivity.

Blood donor reactions are monitored by collection agencies that ensure that donation process does not pose a risk to donor's health. Adverse responses to donation can be

- 1) Acute : immediate or delayed (after single donation)
- 2) Chronic: in response to long term donation

Acute reactions most frequently arise from anxiety about painful venipuncture or susceptibility to blood volume deficit during or after donation.

The most common type of reaction is a vasodepressor reaction associated with changes in pulse and blood pressure¹. Syncope related falls are not uncommon and can cause injuries²⁻⁵.

Vasovagal reactions occur in 2% to 5% of blood donors with 0.34% to 0.8% of donations progressing to syncope. In a 1-year study⁶ in an urban blood center, the incidence of syncope was 0.09%. The reaction occurs before donation

(1%), during or immediately after donation (26%), at refreshment table (61%) and offsite (12%) and usually within 1 hour.

6% of whole blood donors with syncope have emesis and 46% of reactions include clonic movements, tetany or twitching and 5% have incontinence (usually urinary)⁶.

Up to 14% may have traumatic injury as a result of reaction and 6% visiting emergency room without hospitalization.

Phlebotomy related:

Hematomas (9-10%), thrombosis, infection, physical damage to anatomic structures such as median nerve are the few commonly noted problems.

Pseudo aneurysm is a rare complication⁵.

Very rarely injuries to tendons or muscles are possible.

Transection of nerve particularly median nerve could be possible with an incidence of 1 in 6300. These generally present with numbness and tingling, excessive or radiating pain, with occasional loss of strength.

Because peripheral nerves can regenerate and heal, total recovery occurs in over 90% but it can take a prolonged time. This is probably an inherent problem that is not related to technique and is best treated with arm slings and reduced use whenever possible.⁷

Allergic reactions can be seen to ethylene oxide used to sterilize disposable sets or latex-related reactions are also possible.

Long term effects: Among whole blood donors major concern is iron depletion leading to anemia. Over 200 mg of iron is lost with each donation.

59% of donors having no reaction returned to donate within 1 year. For donors with mild reaction the return was reduced to 26% and for more severe reactions it was 14%^{6,7}. The interval from blood donation to subsequent presentation is a useful indicator of donor behavior. Adverse consequences of donation are generally well understood such that donors can be adequately protected. Efforts to decrease reactions will be rewarded because donors who have reactions or suffer long term consequences are less likely to return for further donation⁸.

Adequate hydration before donation along with nutritional intake is considered an important preventive measure by many. A study of high school donors receiving a 16-ounce drink before donation showed a modest 21% reduction in reactions; the mechanism is thought to be gastric distension increasing sympathetic activation⁹. Other methods of reducing donor reactions such as a muscle tensing technique are promising based on both distraction of the donor and maintenance of blood pressure.

MATERIALS AND METHODS

This was a descriptive study done at Department of Transfusion Medicine of Medical College Hospital, Thiruvananthapuram which is the major referral centre and tertiary care centre catering to the whole of the district and also most of districts of south Kerala (Kollam, Allapuzha, Pathanamthitta, Idukki) and few of the neighboring districts of Tamilnadu. The study period was from 1st January 2009 to 31st December 2009. The incidence proportion of donor reactions was studied by follow up of the donors for about half an hour in the refreshment room and other adverse affects that were reported later. Univariate analysis was done by estimating frequencies and proportions with 95% confidence interval

RESULTS

In this survey, we identified 564 complications among 27719 donations. The overall rate of complications was 2035/100000[95% confidence interval (CI): 1870-2210/100000].

Vasovagal reactions

Complications related to vasovagal reactions occurred with a rate of 1151/100000 donations (95% CI: 1023-1279) (Table 2). Most of the complications were vasovagal reactions without loss of consciousness (952/100000 donations, 95% CI: 835-1069), while some experienced loss of consciousness 198/100000 donations (95% CI: 145-251).

Table 1: Grading of donor reactions¹⁰

GRADE	SYMPTOMS/SIGNS	MANAGEMENT
I(MILD)	Pallor, perspiration, sighing/yawning, hyperventilation, feeling of warmth/air hunger, dizziness/light headedness, nausea with or without vomiting	<ul style="list-style-type: none"> • Cold wet towel application on forehead • Encourage donor to cough • Loosen tight clothing • Talk to the donor
II(MODERATE)	Bradycardia, shallow respirations, hypotension(systolic <60 mm Hg), anxiety,	<ul style="list-style-type: none"> • Trendelenberg position, • 95% oxygen if required, • Ammonia inhalation

	unconsciousness, prolonged recovery(>15 min)	
III(SEVERE)	Rigidity or tremor of extremities, variable color (pale to cyanotic), incontinence of urine, convulsions	<ul style="list-style-type: none"> • Maintain airway • Prevent injury from fall or tongue/cheek bite • Saline infusion

Table 2. Frequency of vasovagal reactions

	Number of donors	Percentage of total	Rate Per 100000 (CI 95%)
Mild	264	46.81	952 (835-1069)
Moderate	40	7.09	144 (98-190)
Severe	15	2.66	54 (26-82)
Total	319	56.56	1151 (1023-1279)

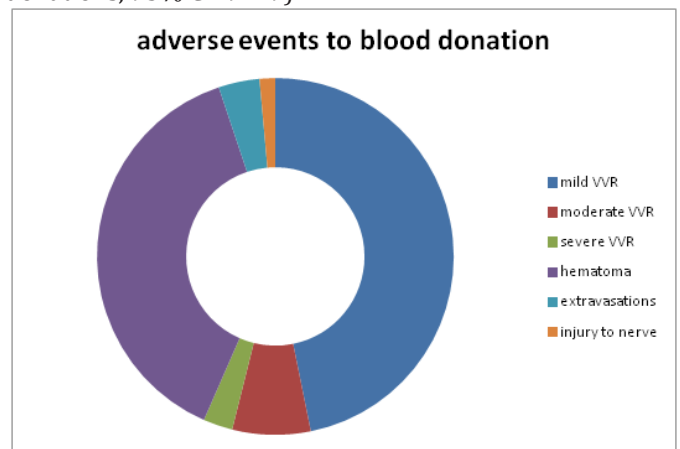
Needle injuries

Local complications caused by insertion of the needle, occurred with a rate of 884/100 000 donations (95% CI: 772-996) (Table 3).

Table 3. Frequency of needle injuries

	Number	Percentage	Rate Per 100000 (CI 95%)
Hematoma	216	38.30	779 (673-885)
Extravasations	21	3.72	76 (43-109)
Injury to nerve	8	1.42	29 (9-49)
Total	245	43.44	884 (772-996)

Most of the complications were vessel injuries with hematoma (779/100000 donations, 95% CI: 673-885) and extravasations (76/100000, 95%CI: 43-109). The remainder consisted of nerve injuries (29/100000 donations, 95% CI: 9-49).



DISCUSSION

We found the overall rate of complications related to blood donation to be low, even when considering all mild complications.

Comparison among international data on blood donation related complications is difficult, because the classification of complications and the quantification of severity vary substantially. The creation of an international consensus on a common classification is in progress and is done by the International Society of Blood Transfusion and the European Haemovigilance Network. A common classification will improve the possibility of direct comparisons, and thereby will hopefully facilitate further studies and initiatives within this area.

A similar rate has previously been reported by Caffrey *et al.*, who also included all cases, irrespective of severity¹¹. We found that the most common types of complications were vasovagal reactions and hematomas. The rate of

vasovagal reactions found in this study was lower than reported in other studies, whereas the rate of vasovagal reactions complicated by a loss of consciousness was slightly higher than in previous reports¹¹⁻¹⁵. The pattern may be explained by the possible under-reporting of late complications, in particular mild vasovagal reactions.

Our study indicates that nerve injury that leads to permanent injury or some degree of disablement is less frequent than other studies, but the rate of complications leading to minor disablement in our study was consistent with previous reports^{5,7}. This may be due to improper reporting back from the donors and proper follow up.

When all categories of nerve injuries were considered, the rate was lower than previously reported. A very few number of donors experienced long-term morbidity in our study. Most donors with long-term morbidity had complaints of arm pain when they were moving it, and some also had radiating pain or sensory changes extending to the forearm, hand or fingers. Hardly any of these donors were eventually deemed disabled due to a donation-related complication. The degree of disablement in general was probably not severe. The symptoms were hardly interfering with the donors' daily activities and therefore can be considered negligible.

Furthermore, the registration of delayed donor complications in our department is based on call back and late-developing complications are therefore only identified if the donor returns with a complaint. Thus, late events could be underreported, in particular, mild complications, such as mild vasovagal reactions. In contrast, the registration of moderate and severe complications is more likely to have been complete.

The donor's physical experience has a significant impact on the willingness to return and donate blood. The blood donor return rate is dependent on the type of adverse effect¹⁶. The interval between donations is directly related to the severity of donor reaction and is prolonged in several types of donors who have experienced reactions¹⁷.

REFERENCES

1. Simon TL, Rhyne RL, Wayne SJ, Garry PJ. Characteristics of elderly blood donors. *Transfusion* 1991; 31:693-7.
2. Pindyck J, Avorn J, Kuriyan M, et al. Blood donation by the elderly. Clinical and policy considerations. *JAMA* 1987; 257:1186-8.
3. Williams GEO. Syncopal reactions in blood donors. *Br Med J* 1942:783-7.
4. Lin JT, Ziegler DK, Lai CW, Bayer W. Convulsive syncope in blood donors. *Ann Neurol* 1982; 11:525-8.
5. Horowitz SH: Venipuncture-induced nerve injury: a review. *J Neuropathic Pain Symptom Palliation* 2005;1:109-114
6. Newman BH, Graves S. A study of 178 consecutive vasovagal syncopal reactions from the perspective of safety. *Transfusion* 2001; 41:1475-9.
7. Newman BH, Waxman DA. Blood donation-related neurologic needle injury: Evaluation of 2 years' worth of data from a large blood center. *Transfusion* 1996; 36:213-5.
8. Edgren G, Hjalgrim H, Rostgaard K, Shanwell A, Titlestad K, Wikman A, Norda R, et al: improving health profile of blood donors as a consequence of transfusion safety efforts. *Transfusion* 2007;47:2017-2024
9. Newman BH. Vasovagal reactions in high school students: Findings relative to race, risk factor synergism, female sex, and non-high school participants. *Transfusion* 2002; 42:1557-60.
10. Principles of Immunohematology. Eva .D. Quinley 2nd edition
11. Caffrey EA, Butler M, Bissell L, Bowden M, Fry R: Establishing a national adverse event reporting system for blood donors- a prospective study of 1.8 million attendances in England and North Wales. *Vox Sang* 2005;1:109-114
12. Newman BH: Blood donor complications after whole blood donation. *Curr Opin Hematol* 2004; 11:339-345
13. Newman BH. Donor reactions and injuries from whole blood donation. *Transf Med Rev* 1997;11:64-75
14. Trouern-Trend JJ, Cable RG, Badon SJ, Newman BH, Popovsky MA: A case-controlled multicenter study of vasovagal reactions in blood donors: influence of sex, age, donation status, weight, blood pressure and pulse. *Transfusion* 1999;39:316-320.
15. Newman BH: Vasovagal reactions and body weight: findings in high and low risk populations. *transfusion* 2003;43:1084-88
16. Newman BH, Newman DT, Ahmad R, Roth AJ. The effect of wholeblood donor adverse events on blood donor returns rates. *Transfusion* 2006;46:1374-9
17. Newman B, Newman D. The effects of the blood donor's physical experience on blood donor return rates [abstract]. *Transfusion* 2003; 43(Suppl):140A.