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Medicine

VASOVAGAL REACTIONS IN HEALTHY VOLUNTARY BLOOD DONORS

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ABSTRACT A prospective study was conducted to estimate the type, incidence, causes and severity of donation related vasovagal reactions in blood donors during the period October 2010 to December 2015 in the Department of Transfusion Medicine at Sher I Kashmir Institute of Medical Sciences, Soura-Srinagar – Kashmir India. During this period 35420 donors donated blood. Donation related vasovagal reactions were graded as mild, moderate, severe and fatal. 224(0.63%) donors suffered donation related reactions. Young age, female sex, low body mass index, outdoor camp donors, first time donors had higher incidence of donation related reactions. The probable factors for donation related Vasovagal events were anxiety of blood loss in 97(43.3%), poor compliance to post donation advice in 65(29%), poor medical explanation about blood donation in 35(15.6%), dehydration due to long travel, previous bad experience at blood donation responsible in 10(4.5%) each and donation of disproportionate volume of blood was responsible in 7(3.1%) of donations with Vasovagal reactions.

KEYWORDS : Donor, reaction, Vasovagal, syncope

Introduction

Blood donors are the main stay of any transfusion service and regular flow of donors is very essential to sustain existence of such a center. It has been estimated that repeat blood donors are at present in sufficient numbers to meet the demand fivefold in most regions.(1)Blood donors normally tolerate the donations very well and adverse reactions to whole blood donations are generally safe but, occasionally adverse reactions of variable severity may occur during or at the end of the collection which may need hospitalization.(2)Vasovagal reactions occur in 2-5% of blood donations,(3-,4) which is largely dependent on the donor's peripheral bar-receptor sensitivity and is influenced by age, hypertension and emotional stress.(5,6)

The systemic reactions, in contrast to the local reactions, can be divided into mild or severe. In most cases, they are vasovagal reactions. Vasovagal reactions occur in two phases. In the pre syncopal phase there is increase in cardiac output and peripheral vascular resistance and during the syncope phase there is sudden reduction in peripheral vascular sympathetic activity resulting in peripheral vascular dilatation with pooling of blood and hypotension.(7,8) Loss of consciousness and drop in blood pressure are the key features of syncope. Vasovagal reactions can be triggered by the pain of the venipuncture, by the donor seeing his or her own blood, by the donor seeing another donor unwell, by the anxiety and state of tension of undergoing the donation, etc. The systemic reactions are characterized by the appearance of pallor, sweating, dizziness, gastrointestinal disorders, nausea, hypotension and bradycardia. Therapeutic intervention must be swift, otherwise this clinical picture, typical of a Vasovagal reaction, will progress into an episode of syncope, of variable severity, which may or may not be complicated by the onset of tonic-clonic muscle spasms (convulsive syncope), accompanied by vomiting and loss of sphincter control. Syncope is defined as transient loss of consciousness with postural collapse by an acute decrease in cerebral blood flow. (9) Physical and psychosomatic reaction may be a major deterrent in individual who have never donated previously.

Materials and MethodsWe studied 36,820 blood donors for donation related reactions in the Department of Transfusion Medicine at Sher -I -Kashmir Institute of Medical Sciences, SouraSrinagar Kashmir, India from October 2010 to December 2015. A total of 35,420 donors were included and studied for a possible blood donation related reactions. No plasma or platelet apheresis donor was included in the study Criteria used for selection of blood donorswere as per drugs and cosmetics rules 1945 Govt. of India. The donors were in the age group of 18-60 years. No donor was less than 45 Kgs in weight. Systolic and diastolic blood pressure was within normal limits with blood hemoglobin level not less than 12.5gm%, was free from any disease transmissible by blood transfusion as for as was possible, to rule out by preliminary examination. Donors who had not taken any food over last four hours were not bled. 350ml of blood was drained from donors weighing 45-60 Kgs and 450ml in donors with weight 60 Kg and above. The donation period lasted for 10-15 minutes. Donors were strictly advised to lie down on couch for a period of five minutes after donation during this period vein puncture site was dressed by the attending phlebotomist. After this donors were given soft drink and biscuits in the adjacent refreshment room. During this period donors were watched for any donation related reaction. Blood donors were allowed to leave after refreshment with the following advice.

01. Take adequate oral fluids.
02. Do not drive any vehicle or smoke for one hour post donation.
03. Report back to transfusion centre in case of any reaction.

All the blood donors were strictly watched for a potential donation related reaction during and after blood donation, donation related reactions were graded into mild, moderate, severe and fatal. Mild grade was defined as presence of anxiety, perspiration, sweating, nausea and vomiting. Moderate was defined as dizziness or fainting. Severe was definedas loss of consciousness and fatal was described as any event which needed patient's admission in hospital like repeated convulsions or failure to respond to conservative therapy or a coronary event in the form of Angina or myocardial infarction.

RESULTS

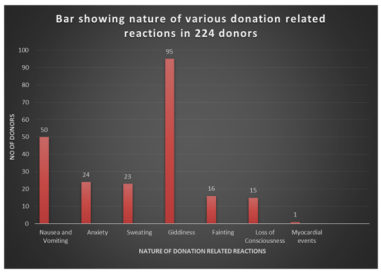
We analyzed 35420 blood donors for vasovagal reactions of varying severity. Majority of our patients were with a body weight of 45-60Kg and tolerated withdrawal of 350 and 450ml of blood respectively without any significant donor reaction. 224(0.63%) of donors suffered Vasovagal reactions of varying severity which, ranged from feeling of uneasiness to loss of conscious.

Table 1:Severity of donor reaction in different age groups:

Type of reaction	18-35 Years n(20620)	36-50Years n(14210)	50-60Years N(35420)	Total Number
Mild	51	42	04	97
Moderate	62	44	05	111
Severe	03	05	07	15
Fatal	0	01	0	01
Total	116(0.56%)	92(0.64%)	16(0.63%)	224

There were 32940 (93%) males and 2480(7%) females. The donors were divided into three groups on basis of age. There were 20620 donors in age group (18-35), 14210 donors in (36-50) and 590 donors were of age more than 50 years. (Table 1) The natures of various systemic reactions are shown in Bar Chart. The Vasovagal reactions were classified into three groups, mild, moderate, severe and fatal. Majority of the donors experienced mild to moderate reactions.A severe reaction in the form of convulsions or loss of consciousness was observed in 14 and a fatal reaction in the form of acute myocardial event was observed in one donor only. 34711(98%) were first time and

709(2%) were periodic donors.



Some donation related vasovagal reaction occurred at variable period of time from mid donation to till donor was in refreshment room that is within 15 minutes of donation. Reactions of moderate nature in the form of giddiness was detected in 111(49.55%) followed by mild reactions in the form of anxiety, perspiration, sweating, nausea and vomiting in 97(43.3%) and severe in the form of loss of consciousness in 15(6.7%) of donations. While fatal reaction in the form of acute myocardial infarction was detected in one donation only. Moderate reactions were more common and were present in younger donors; it was also observed that younger age group suffered higher reaction episodes than the elder age group donors. Blood donation related reaction were more frequent but of lesser severity in first time donors than repeat donors and were observed in 0.1% of donors. Sweating, nausea and vomiting were the commonest reactions observed in about 45% donors with few donors (4.9%) presenting with features of syncope. Female sex irrespective of weight had higher incidence 26% of reaction and were 3.5 times more common than males. Donors with body weight of 45-60 kg had higher frequency of reaction and were found in 65% donors, while donors with higher weight (more than 60kg) had less frequency of donor related reaction and constituted 35% ($p<0.05$). The frequent probable cause which could influence the donation related reaction war anxiety of blood loss in 97(43.3%) donors and was followed by poor compliance to donation related advice in 65(29%), poor medical explanation about donation was found in 35(15.5%) donor dehydration due to long distance travel prior to donation and previous bad experience at donation were observed in 10(5.7%) donors each. Disproportionate volume of blood donation was observed in 7(3.1%). Table 2

Table 2:Probable factors for donor reaction in 224.

01	Anxiety of blood loss	67	38.5%
02	Poor compliance to post donation advice	50	28.7%
03	Poor medical explanation about donation	35	17.5%
04	Dehydration due to long travel	10	5.7%
05	Previous bad experience at donation	10	5.7%
06	Disproportionate volume of blood donation	02	1.14%
	Total	224	100%

Among those subjects who did suffer adverse reactions, the systolic blood pressure never decreased below 90 mmHg immediately after the vasovagal reaction or syncope; the diastolic blood pressure values never fell below 40 mmHg and the heart rate was never slower than 40 beats per minute. For these reasons, it was not necessary to use more aggressive therapy; in all cases, intravenous infusion of crystalloids and oral administration of vasopressors was sufficient to control the symptoms. Subjects with severe symptoms were given not only oral vasopressors, but also intravenous infusion of crystalloids in a ratio of 3:1, as suggested by the best accredited guidelines and protocols on blood loss. In no case was it necessary to use atropine to restore the heart rate. All subjects, who had vasovagal reactions, recovered within 5-10 minutes after the donation, whereas the donors who suffered syncope recovered in 15-20 minutes with fluid compensation.

DISCUSSION

Blood donation related vasovagal reactions are multifactorial and donation of 350-450ml of blood in healthy people constituting 10-13% of blood volume produces trivial effects and most people tolerate blood donation of this volume quite satisfactorily. A few people develop reactions ranging from mild to severe in nature and can occur at any time from needle prick to hours after donation.(12) A small number of blood donors experience reactions ranging in severity from feeling of uneasiness to obvious symptoms like fainting or even generalized convulsions. The frequency of donation related reactions of variable nature were observed in 224(0.63%) of donations. Donation related reactions were observed at variable time period from the time of venipuncture till donor was in refreshment room. Donors who left the refreshment area were not included in the study. Mild to moderate reactions were observed in 91.4% of donors and were similar to 93% observed by others while, severe reactions were observed in 8% donors.(13) Psychosomatic elements are responsible for many reactions. Donors who are sensitive to sights and smell associated with hospital procedure as blood and needles are ones likely to experience adverse reaction more frequently.(14,15) A friendly cheerful atmosphere reduces anxiety and phobia of donation and is likely to reduce the donation reaction (16,18)

The pain caused by prolonged insertion of needles in the subject's upper limb can be lead to vasovagal reactions and other systemic complications and in case the process is prolonged due to superficial vasoconstriction (collapsed veins). It can lead to cold skin, cold seating, pallor and mild systemic complications. The incidence of systemic complications also has significant relationship with failure to observe two important points including not smoking within one hour after blood donation and more fluid consumption within four hours of blood donation. (19)This may be due to the fact that smoking leads to changes in the pulse and lowering in blood pressure thereby increasing the chances of developing systemic complications. It is clear that fluid intake helps in compensating for the lost blood volume this prevents systemic complications. Our study showed that systemic complication resulting after donation had a significant relationship with walking or exercise prior to blood donation such that the frequency of systemic complications among blood donors who had exercised 1.5 hours prior to blood donation was 2.5 times more common compared to other donors others have observed an incidence of 3.1 times more.(20) The cause for this finding is not clearly understood but fatigue, loss of body fluids due to sweating and hypoglycemia due to exercise may be probable causes, which ultimately lead to inadequate potential for the body to compare for the fluid loss. Female donors irrespective of weight had higher incidence of reactions and were 3.5 times more common than males. First time donors, lean thin and low body weight donors had higher frequency of reactions as was observed by others(13,19) It is due to expected more anxiety at first donation. The stress has direct emotional effect and may affect peripheral ventricular baroreceptor sensitivity.(19) Most cases fainting due to Vasovagal reactions is caused by fright and anxiety and was observed in 67(38.5%) of donations. Anxiety has direct emotional consequences and affects central neural activity to stimulate peripheral vasodilatation. Poor compliance to post donation advice like rest for few minutes with intake of some refreshment in the form of fluids or fruits was not followed by 50(28.7%). The same was observed more in young donors $P<0.5$ it probably was to their false confidence, immaturity and poor cooperation. Previous bad experience at donation was observed in 10(5.74%) of donors all of them had experienced some nature of mild to moderate reaction during their previous donation and it was the anxiety and experience of that previous donation which was responsible for reaction at present as anxiety of donation is a well -known factor for donation related reactions and decrease in donor anxiety can result in a significant reduction in negative donation experience. Bleeding of inappropriate volume of blood to body weight leading to moderate reaction was noticed in 21.1% of donations which was a negligence of the phlebotomist. First time donors, female sex, lean thin and low weight donors had higher rate of reactions as was observed by other studies .(12, 14, 15) There was no relation of reaction type to a particular phlebotomist. It was observed that higher number of donor reaction 8% were observed in outdoor camp donors, this was probably due to majority of outdoor donors were young and were not given enough time to relax at donation and in the immediate post donation phase. Pre-donation blood pressure and pulse had no relation to donation related reactions as has been observed by others (15, 18). It was also observed that 2.7% of older age group suffered reaction episodes and were higher than the 0.56% observed in younger age group donors(<0.5). Sweating, nausea and vomiting were the commonest reactions observed in about 45% donors with few donors 4.9% presenting with features of syncope. Donor related reactions were more frequent in first time donors and were observed in 2% as compared to repeated donors 0.1%($P<0.1$).

Female sex irrespective of weight had higher incidence of donation related reaction and were observed in 26% while only 6% males suffered such reaction .($P<0.5$) Donors with body weight of below 60

Kg had higher frequency of donation related reaction. Probable factors which could influence the donation related reaction were anxiety of blood loss in 97(43.3%) donors and was the commonest cause followed by poor compliance to donation advise in 65(29%), donor dehydration due to long distance travel was observed in 35(15.6%). Previous bad experience at donation, poor medical explanation and drainage of disproportionate volume of blood from the donor were found in 10(4.5%), 10(4.5%) and 7(3.1%) donors respectively. Donor anxiety as a cause for donor reaction has been observed by many others (13, 16, 19, 20) The rest have not been studied till date they need further confirmation with further studies.

Fatal reaction in the form of acute myocardial infarction was observed in one patient. Who had elevated cardiac enzymes and electrocardiographic evidence of anterior wall infarction. He was admitted in ICU and, needed thrombolytic therapy and was discharged from hospital after few days of hospitalization in a stable condition. Fatal reactions in the form of acute myocardial reactions are rear and few case reports of chest pain have been reported. (21,22) but none had evidence of frank myocardial infarction on electrocardiogram or enzyme elevation. Marked individual variation exists in the susceptibility to ischemia that follows blood withdrawal. Convulsive syncope (severe reaction) occurred in 14(0.04%) which is similar to 0.03% as observed by other.(21) Donors can be retained by identifying the individuals at increased risk of reactions; so that pre-donation advice and other strategies that reduce the risk of syncopal reaction can be offered.

CONCLUSION

The incidence of blood donation related adverse reactions in this study was very low (0.63%). Marked individual variation may exist in the susceptibility of central nervous system to ischemia that follows blood withdrawal. Vasovagal reaction subsequent to blood donation are of multiple and different cause.

Sex, weight, body frame, procedure related education, phobia of donation are the leading cause of such reaction. Donor education about blood donation, dehydration immediate prior to donation, adherence to medical advice about the donation procedure, compliance to medical leave following a donation and the donation procedure with developing confidence in the blood donors will definitely reduce the donation related reactions. Hence, it is important to recognize that any donor can experience vasovagal reactions. Donor education about donation procedure and precautions needed for the past donation to be taken very strictly and no donor should be left unattended. It is nevertheless desirable to reduce risks to a minimum, working not only with the maximum environmental safety, but also with complete medical assistance.

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