

Original article:

A comparative study of pulse pressure before and after blood donation with and without oral rehydration salt water supplementation as a physiologic strategy to prevent fainting responses

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Abstract

Introduction: During blood donation, 2-5% of blood donors experience vasovagal reactions like syncope which may lead to serious injuries. In this current study effect of oral rehydration salt water given orally (half an hour before blood donation) as a physiologic strategy to preventing fainting after blood donation has been studied.

Material and methods: The study included 100 voluntary blood donors at AJ Institute of medical sciences, Mangalore. 50 controls (without oral rehydration salt water supplementation) and 50 cases (with oral rehydration salt water supplementation). Systolic blood pressure, diastolic blood pressure recorded Pulse pressure calculated and compared half an hour before blood donation and after blood donation. Statistical analysis performed.

Results: The results suggested a statistically significant fall in pulse pressure in controls (without oral rehydration salt water supplementation) when compared to cases. (with oral rehydration salt water supplementation).

Conclusion: Oral rehydration salt water supplementation before blood donation can be considered as a physiologic strategy to improve pulse pressure and so the blood volume to prevent fainting responses.

Key words: vasovagal syncope, fainting, pulse pressure.

Introduction:

Donating blood is a generous life-saving gift. It is important to take care of blood donor's health care aspect. Vasovagal reactions are seen in 2-5% of blood donations¹. Syncope occasionally leads to injury. Prevention of vasovagal reaction in blood donations is there by an important issue. The amount of blood collected during a whole blood donation is around 500 ml and 40-50 ml for testing (540 ml)² which is equivalent to amount of blood pooled in veins during rapid standing from a supine position (300-800 ml)³. In India amount of whole blood donation is 350 ml. This causes fainting and

orthostatic intolerance. The physiologic mechanisms are direct effects of removal of 540 ml of whole blood, the psychological stress of instrumentation and giving blood (i.e., fear of needles, pain, and the sight of blood), and the orthostatic effects superimposed on a hypovolemic state after the donation⁵.

To prevent syncope in patients with orthostatic hypotension, lower body muscle tensing, plasma volume expansion, and water drinking have been applied as physiologic strategies⁶. Pulse pressure measurement can be used as an indicator to check the plasma volume of the subject. With this background, the present study was undertaken to study the effect

of oral rehydration salt water administration prior to blood donation on pulse pressure and orthostatic hypotension.

Aims & objectives:

To study the effect of oral rehydration salt water supplementation on pulse pressure before and after blood donation

Materials & methods:

Hundred healthy volunteers with 18-40 years of age group were selected from blood donation camp/ blood bank for the study. Subjects with history of hypertension, diabetic mellitus, pregnancy, blood loss, orthostatic hypotension, menstrual irregularities were excluded. Written informed consent with relevant data (name, age, sex) was taken. Subjects were divided into group A which included controls

(physiological strategy was not applied to prevent fainting responses) and group B which included intervention to prevent fainting responses (1.2 gm oral rehydration salt was measured and dissolved in 500 ml bottled water, which was given to the subjects 30 min before blood donation) . Each group included 50 subjects. Blood pressure was measured and pulse pressure calculated 30 min before blood donation and immediately after blood donation.

Observations & results:

Results were compared in percentage as the data was nominal. Analysis was done using Microsoft XL, statistical package for social sciences (SPSS) version 16 for windows. Pearson’s test was used in studying correlation between parameters. ‘P’ value ≤ 0.05 was considered as statistically significant.

Table I: Comparison or (SBP, DBP and PP) before & after blood donation in group A

Measurements	Before blood donation (Mean+/-SD)	After blood donation (Mean+/-SD)	P Value*
Systolic BP (mm/Hg)	122.44+/-3.8	114.44+/-3.1	0.001
Diastolic BP (mm/Hg)	80.42+/-2.3	78.84+/-2.7	0.01
Pulse Pressure	40.36+/-2.1	36.54+/- 2.2	0.01

*Paired 't' test

Table II: Comparison or (SBP, DBP and PP) before & after blood donation in group B

Measurements	Before blood donation (Mean+/-SD)	After blood donation (Mean+/-SD)	P Value*
Systolic BP (mm/Hg)	120.42+/-3.7	118+/-3.2	0.001
Diastolic BP (mm/Hg)	80.46+/-2.6	76.82+/-2.1	0.01
Pulse Pressure	40.32+/-2.0	42.94+/-2.1	0.01

*Paired 't' test

Table III: Comparison or (SBP, DBP and PP) after blood donation in between Group A and group B

Measurements	Before blood donation (Mean+/-SD)	After blood donation (Mean+/-SD)	P Value*
Systolic BP (mm/Hg)	114.44+/-3.1	118+/-3.2	0.001
Diastolic BP (mm/Hg)	78.84+/-2.7	76.82+/-2.1	0.01
Pulse Pressure	36.54+/-2.2	42.94+/-2.1	0.01

*Independent 't' test

Discussion:

The dietary sodium intake (NaCl) determines the extracellular volume and plasma volume, which is directly related to the blood volume in the body⁹⁻¹¹.

Hence there will be some beneficial effects on plasma volume by increasing dietary sodium intake, which can reduce the postural hypotension to certain extent.

In a study conducted by El-sayed and Hainsworth, it is proved that chronic plasma expansion induced by increased dietary oral rehydration salt intake has increased the fainting time (during combined tilt-body suction experiment) from approximately 20 minutes on standard oral rehydration salt diet to 30 minutes on high oral rehydration salt diet¹².

The present cross sectional study aimed to evaluate the effect of oral rehydration salt water administration 30 minutes before blood donation as a physiologic strategy to reduce the incidence of fainting post blood donation in subject with age group 18-40 years. In the present study, the Group B showed less fall in blood pressure when compared to controls. This may be attributed to plasma volume expansion there by the blood volume, due to oral rehydration salt water supplementation.

There was significant fall in SBP, DBP and PP after blood donation in both Group A and group B. There was significant improvement in SBP, DBP and PP after oral rehydration salt water supplementation (in group B) before blood donation when compared to group A. This might be attributed to plasma volume expansion and there by blood volume expansion after oral rehydration salt water supplementation supported by similar studies^{6, 7&8}.

Conclusions:

There was fall in blood pressure after blood donation, with and without oral rehydration salt water administration, when compared to before blood donation. Also there was decline in number of donors getting hypotension/fainting feeling after administration of oral rehydration salt water 30 minutes before blood donation, when compared to controls. However the improvement in hypotension was not statistically significant. So this physiologic strategy may be advised to prevent fainting responses and to increase blood volume and there by pulse pressure. But need further studies to consider as protocol & compulsory.

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