International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 02 (D); February 2019; Page No.17403-17405
DOI: http://dx.doi.org/10.24327/ijcar.2019.17405.3300

Research Article

A PROSPECTIVE STUDY OF PREVALENCE OF FEBRILE NONHEMOLYTIC TRANSFUSION REACTIONS DUE TO DIFFERENT BLOOD COMPONENTS IN A TERTIARY CARE HOSPITAL

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A R T I C L E I N F O

Article History:
Received 13th November, 2018
Received in revised form 11th December, 2018
Accepted 8th January, 2019
Published online 28th February, 2019

Key words:

Febrile Nonhemolytic Transfusion Reactions (FNHTRs)

A B S T R A C T

Introduction: Febrile nonhemolytic transfusion reactions (FNHTRs) are characterized by fever (≥1°C elevation) that may be accompanied by chills, rigors, hypertension, tachycardia, and dyspnoea without another clinical explanation.
Aim: To analyse the incidence rate of FNHTR due to transfusion of different types of blood components and improve patient care and safety.
Material and Methods: A prospective study of transfusion reactions was conducted between August 2017 to November 2018 at the Blood Bank attached with department of Transfusion Medicine at Sardar Patel Medical College & Associated Group of Hospitals, Bikaner (RAJ.).
Observations and Results:A total of 60967 units of blood components were issued to patients during the study period. 40346 units of PRBCs units were transfused and out of which 1853 were prestorage leukoreduced and 38493units were non- leukoreduced PRBC. A total of 16 transfusion reactions were classified as FNHTRs.
Conclusion: The reduction of FNHTRs is supporting the use of prestorage leukoreduction of PRBCs and has a legitimate role to play in clinical transfusion practice. The rate of FNHTRs to allogenic PRBC units after the implementation of prestorage leukoreduction has decreased significantly.

INTRODUCTION

Febrile nonhemolytic transfusion reactions (FNHTRs) are characterized by fever (≥1°C elevation) that may be accompanied by chills, rigors, hypertension, tachycardia, and dyspnoea without another clinical explanation.[1]

Leukocytes and cytokines released by leukocytes in the transfused allogeneic blood components are important causes of FNHTRs, but other mediators such as platelet-derived soluble CD154 (CD40 ligand) are also likely involved in its etiology. [1,2] The removal of the WBCs before storage will both prevent the accumulation of cytokines during storage and will also remove the antigenic targets for preformed anti-WBC, leading to a reduction in the number of FNHTRs.[3]

Despite the lack of change in cytokine levels during storage, prestorage leukoreduced (PrSLR) RBCs have been associated with lower rates of FNHTR compared to poststorage leukoreduced RBC units.[4,5]Poststorage Leukoreduction has been shown to be equally effective in removing WBCs compared to prestorage WBC reduction and may even have added benefit of removing certain activated complement fragments, although it cannot abrogate the accumulation of WBC-derived cytokines during storage.[6]

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As infectious complications from blood transfusion decrease due to improved donor questionnaires and sophisticated infectious disease blood screening, non infectious adverse reactions (ARs) have emerged as the most common transfusion complication.[7]

About 0.5-3% of all transfusions results in some adverse events, but most are minor without any significant consequence.[8,9] However, the system of recording and reporting of the adverse events related to blood transfusion is lagging.

In the developing countries like ours (India), blood transfusion services are fragmented, non uniform, with different levels of care depending on the institution. National AIDS Control Organisation (NACO) lays down the policies for blood banks and transfusion services, and regulatory body is the Drug Controller, India.[10]

Aim

To analyse the incidence rate of FNHTR due to transfusion of different types of blood components and improve patient care and safety.

MATERIAL AND METHODS

A prospective study of transfusion reactions was conducted between August 2017 to November 2018 at the Blood Bank attached with department of Transfusion Medicine at Sardar Patel Medical College & Associated Group of Hospitals, Bikaner (RAJ.). During the study period 60967 units of blood/blood components were transfused and assessed for transfusion reactions. During issue of blood/blood component a complete cross match report along with Transfusion Reaction Reporting form (TRRF) were provided containing written guidelines regarding bedside monitoring of the transfusion event and the procedure of reporting of the transfusion-related adverse event.

Flow Chart

Clinical Ward /Ot; Adverse reaction noted by clinician/nurse.

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Clinical Ward : fill up form (ATRF) and send with blood bag and attached tubing along with a fresh sample of patient blood in department of transfusion medicine for further investigation including repeat ABO/Rh grouping, Repeat antibody screening, cross match and Direct antiglobulin test.

↓

Cinical Ward: send EDTA blood sample of patient in hematology lab for CBC, plasma free Hb, coagulation screen and first post-transfusion urine sample for urine Hb, routine and microscopy examination.

↓

Clinical Ward: send clotted blood sample to biochemistry lab for Renal function test (urea, creatinine and electrolytes), Liver function test (billirubin ,ALT,AST).

↓

Clinical ward: send post transfusion blood to special blood culture bottles to Microbiology Labs.

↓

Department of transfusion medicine: further investigate to transfusion reaction as per TR workup form, document the finding, compilation of reports from other departments and reporting result and interference to respective clinical ward .

↓

Technical Associate Pvpi: Enter the information as per TRRF of blood and blood component and submit to haemovigilance center, NIB.

OBSERVATIONS AND RESULTS

A total of 60967 units of blood components were issued to patients during the study period. 40346 units of PRBCs units were transfused and out of which 1853 were prestorage leukoreduced and 38493units were non- leukoreduced. A total of 16 transfusion reactions were classified as FNHTRs.

The distribution of blood units to inpatient of our hospital during study period

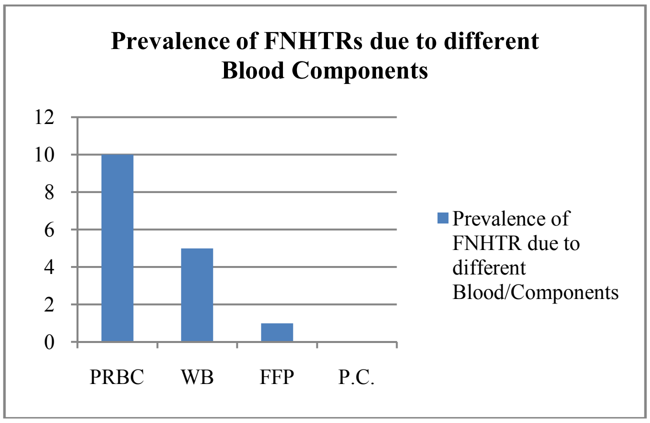
Components (transfused)	Number of units	Percentage
PRBC	40346	66.17%
WB	2857	04.68%
PC	9491	15.56%
FFP	8273	13.56%
TOTAL	60967	100%

The Prevalence of FNHTRs Due To Different Blood Components

Blood/Component	PRBC	WB	FFP	PC	Total
Units transfused	40346	2857	8273	9491	60967
Number of patients having FNHTR	10	05	01	00	16
Prevalence (%)	0.024	0.175	0.012	00	0.026

PRBC=Packed Red Blood Cells
W.B. =Whole Blood
F.F.P. =Fresh Frozen Plasma
P.C. =Platelets Concentrate

Average transfusion reaction rate with red cell concentrate (PRBC) was 0.024% (10 out of 40346). None of transfusion reaction reported with buffy coat depleted PRBC (1853units). In contrast, use of WB cells had a high reaction rate of 0.175 % (5out of 2857 units).Average transfusion reaction rate with FFP was 0.012% (01 out of 8273 units).



Prevalence of FNHTRs in Leukoreduced vs Non-Leukoreduced PRBC

Blood component	Leukoreduced PRBC	Non-Leukoreduced PRBC	Total
Number of units transfused	1853	38493	40346
Number of patients having FNHTR	00	10	10
Prevalence (%)	00	0.025	0.024

40346 units of PRBCs units were transfused and out of which 1853 were prestorage leukoreduced and 38493 units were non- leukoreduced PRBC. Febrile non-hemolytic transfusion reaction rate with Non-leukoreduced PRBC transfusion was 0.025%(10/38493). None of transfusion reaction reported with leukoreduced (buffy coat depleted) PRBC (1853units).

CONCLUSION

The reduction of FNHTRs is supporting the use of prestorage leukoreduction of PRBCs and has a legitimate role to play in clinical transfusion practice. The rate of FNHTRs to allogenic PRBC units after the implementation of prestorage leukoreduction has decreased significantly.

Patients who are multiple transfused i.e. thalassemia major that have lifelong transfusion requirement, have the maximum benefit from such leukoreduced PRBCs.

Prestorage leukoreduction of PRBC will definitely help in improving patient care and safety of blood transfusion.

Limitation

Clinical reporting was the only source of information about incidence of transfusion reactions.

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How to cite this article:

Vinod Agarwal *et al* (2019) 'A Prospective Study of Prevalence of Febrile Nonhemolytic Transfusion Reactions Due to Different Blood Components in A Tertiary Care Hospital', *International Journal of Current Advanced Research,* 08(02), pp.17403-17405. DOI: http://dx.doi.org/10.24327/ijcar.2019.17405.3300

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