NAVIGATING TRANSFUSION NEEDS IN HEART TRANSPLANTATION SURGERY IN TERTIARY CARDIAC CARE HOSPITAL

Dr Dhara Darshan Patel1, Dr Shital Soni,2 Dr Brijesh Patel3, Dr Nirali Patel1, Dr Hinal Prajapati1, Dr Truptee Thakkar1

1. Full time ImmunoHematologist & Blood Transfusionist 2. Assistant prof in path & In-charge blood centre 3. Senior Pathologist

BLOOD CENTRE, U N MEHTA INSTITUTE OF CARDIOLOGY AND RESEARCH CENTRE, MEDICITY CAMPUS, AHMEDABAD.

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BACKGROUND & OBJECTIVES

Excessive blood requests are a common challenge faced by the transfusion services. Nearly 66% of all the blood transfusions are performed during the perioperative period.1 in practice, whenever blood unit is crossmatched for a patient, it is rendered unavailable to others for 48 h and also results in aging of the blood unit during reserved period. However, guidelines for transfusion volume may vary among different medical institutions. A hospital may create its own standard guidelines by investigating the amount of blood transfused for surgery, calculating statistics, and setting its own MSBOS. Because of improved physician skills and surgical techniques along with changes in perceptions about transfusion, the amount of transfusion products required for the same surgery may change over time.2 Organ transplant surgery is known to require a high volume of blood transfusions,3 but only a few studies have reported on transfusions or the MSBOS of transplants.3-5

In this study, we investigated blood transfusion volumes that were transfused preoperatively, intraoperatively, and postoperatively in heart transplants. This study was conducted to evaluate the changes in transfusion requirements and predict transfusion patterns during heart transplantation.

MATERIALS & METHODS

We retrospectively included 37 patients who received heart transplantation (HT) in our tertiary care cardiac hospital from September 2022 to September 2024. We measured the amount of blood products transfused preoperatively (from hospitalization to surgery), intraoperatively (during surgery), and postoperatively (from 1 day after surgery to the discharge date). Blood products included red blood cells (RBCs), fresh frozen plasma (FFP), platelet concentrates (PLT), apheresis platelets, and whole blood–derived cryoprecipitate (CRYO). One unit of apheresis platelets was calculated retrospectively as being equivalent to 6 units of whole blood–derived PLT. The packed RBC blood products included both leucoreduced and irradiated RBCs. Irradiated blood components are treated with radiation to prevent transfusion associated graft-versus-host disease.

RESULTS

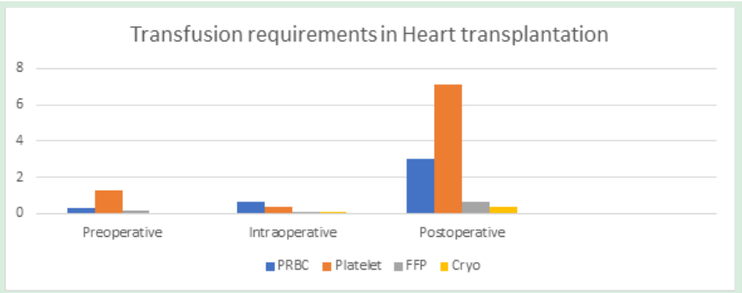
The background characteristics of the patients are shown in Table 1. Among 37 patients 17 patients were diagnosed with dilated cardiomyopathy, 8 patients had congestive heart failure, 8 patients were diagnosed with heart failure because of acute myocarditis, and 4 patients were diagnosed with Hypertrophic Cardiomyopathy.

Table 1: Demographic Data of Study Participants

Characteristics	
Mean age,	36.59
Male (%)	28 (75.67%)
Female (%)	9 (24.32%)
Diagnosis	
DCMP	17 (45.94%)
Congestive heart failure	8 (21.62%)
Heart failure due to acute myocarditis	8 (21.62%)
Hypertrophic cardiomyopathy	4 (10.81%)

The analysis of preoperative, intraoperative, and postoperative transfusion volumes in patients who received HT shown in Figure 1 and Table 2. The most frequently transfused blood product was platelets, followed by PRBC, FFP, and CRYO. Platelets were the most postoperatively transfused blood product than preoperatively.

Figure1: Transfusion requirements for RBCs, Platelet, FFP, and Cryo in the preoperative, intraoperative, and postoperative phase in HT



Category	PRBC	Platelets	Fresh Frozen Plasma	Cryoprecipitate
Preoperative	0.32	1.24	0.18	0.00
Intraoperative	0.62	0.35	0.05	0.10
Postoperative	3.02	7.10	0.67	0.35

DISCUSSION

Appropriate transfusion support is needed to increase the success rate of HT. To support transfusion, it is important to accurately estimate the amount of transfusion products needed before, during and after transplantation. For example, in organ transplantation, the heart can be donated from a living donor or one who is brain-dead. Unlike with organ transplantation from living donors, brain death is always unexpected and thus there is less time to arrange blood replacement supplies than with an elective surgery.6 Studies of blood transfusion can be used to estimate the amount of blood products needed or to analyze optimal volumes of blood requirement.7-10

Furthermore, this study examined the results of previous studies on blood transfusion in transplants. One study conducted 2192 heart transplantations for 1 year and transfused on average 2 to 4 units of RBC, 1.6 units of FFP, and 1 unit of platelets during surgery.8 Other study conducted 54 heart transplantations for 8 years and transfused on average 7.83 units of RBC, 2.67 units of FFP, and 13.13 units of platelets and 1.74 units of Cryoprecipitate.11

Surgical technique and experience are the most important factors that influence blood transfusion volume. However, advances in surgical experience or technology may not be the only criteria for predicting the volume of blood transfusions.

In our study, PLT was transfused more than other blood products. The transfusion volume depends on the patient's disease and on preoperative and postoperative conditions, including age, risk of preoperative bleeding, and underlying disease. Even for the same operation, the blood transfusion volume varies from hospital to hospital.12 For example, hospitals with a higher percentage of high-risk patients may have a higher blood transfusion requirement than other hospitals.13 In this study, the intraoperative transfusion volume of platelets decrease, but it showed an increase in postoperative category that was probably attributable to the increased proportion of high-risk.

CONCLUSION

Massive transfusion is defined as the transfusion of 8 to 10 units of packed RBCs within 24 hours.14 Each HT requires transfusion volumes that are comparable to that of a massive transfusion. In hospitals that prepare for transplants, a sufficient number of blood components are needed, and it is also important for blood centres to maintain adequate blood inventory. A lack of blood products could delay needed transfusions, and stocking excessive quantities of blood products can increase wastage. Therefore, for efficient management of blood resources, periodic blood transfusion evaluation will facilitate efficient preparedness for the transfusion of blood products during transplantations. Further studies with large sample size to be needed for detailed analysis.

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