

Department of Transfusion Medicine and Cell Therapy

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General Summary

Patient blood management is an evidence-based approach to optimize the care of patients who might need blood transfusions, as described by the American Association of Blood Banks. The term “patient blood management” was first used in 2005 by Prof. James Isbister, an Australian hematologist, to emphasize the importance of improving the outcomes of patients after transfusion. In other words, the focus during transfusion should be changed from blood products to patient care. To achieve this goal, the cooperation of nurses is essential and has been enhanced by the introduction of transfusion nursing certification by the College of Transfusion Nurses in Japan in 2010 by Prof. Tasaki, Prof. Hitoshi Ohto (Fukushima Medical University) and others. Therefore, we teach nurses inside and outside of The Jikei University Hospital about their role in transfusion medicine, including the appropriate and safe use of blood products.

The main research activities in 2018 were as follows: (1) the efficacy of cryoprecipitates in patients with massive blood loss during surgery, (2) the risk of bacterial contamination of blood for transfusion when connecting the transfusion set to the blood bag, (3) the significance of leukoreduction of autologous blood, (4) the production of alloantibodies in children, (5) the effectiveness of HLA-matched platelets in patients with platelet transfusion refractoriness, and (6) a report on a rare case of delayed hemolytic transfusion reaction due to anti-Kell antigen antibodies.

Research Activities

Efficacy of cryoprecipitates in patients with massive blood loss during surgery

In patients with massive blood loss, hemostasis can be difficult owing to the consumption and dilution of coagulation factors. In Japan, however, no commercially available cryoprecipitates are available for such patients, and fresh frozen plasma (FFP) is often used. Therefore, in January 2017 we began preparing cryoprecipitates derived from allogeneic FFP for patients undergoing cardiac surgery, during which massive blood loss and a need for FFP are possible. In a pilot study of 14 patients in whom cryoprecipitate was used, significant hemostasis was observed. In the next stage, overall evaluation based on such variables as total units of blood used, operation duration, length of hospitalization, and cost-effectiveness will be needed to show the significance of cryoprecipitate use for the treatment of massive blood loss.

Bacterial contamination of blood when a blood bag and a transfusion set are connected

Bacterial contamination of transfused blood can severely endanger patients. Although blood is drawn and stored in a blood center, it is not always properly handled at the bedside. When a blood bag and a transfusion set are connected, blood rarely leaks but can

leak via blood bag breakage or a loose connection. We have experimentally examined how blood is contaminated with bacteria, for example, if a transfusion set is prepared with unclean, ungloved hands.

Significance of leukoreduction of autologous blood

Prestorage leukoreduction of blood components is often performed to avoid adverse events. However, whether this procedure is beneficial for autologous blood is unknown. To identify possible benefits, we performed a prospective randomized crossover study in which patients undergoing 2-stage bilateral total hip arthroplasty received either leukoreduced blood (93 patients) or non-leukoreduced blood (99 patients) during the first operation and received the other type of blood during the second operation. The results of this study did not show any superiority of prestorage leukoreduced autologous blood over non-leukoreduced autologous blood.

Production of alloantibodies in children

Whether neonates are able to produce alloantibodies against red blood cell alloantigens is unclear. Professor Yoshiko Tamai (Hirosaki University) and colleagues started the distribution of questionnaires regarding this issue to hospitals where more than 30 children per year receive allogeneic blood.

Effectiveness of HLA-matched platelets in patients with platelet transfusion refractoriness

Platelet transfusion refractoriness due to alloantibodies to platelets is a serious problem in patients frequently needing platelet transfusion. In these cases, transfusion of HLA-matched platelets seems effective. However, the use of cross-matched positive platelets is unavoidable in an emergency situation. Hagino et al. evaluated the effectiveness of such platelets on the basis of the 1-hour posttransfusion corrected count increment.

A case of delayed hemolytic transfusion reaction due to anti-Kell antigen antibodies

Hemolytic transfusion reactions due to antibodies against low-incidence red blood cell Kell antigens (Kp^c) have rarely been reported in Japan or in other countries. We report a rare case of hemolysis after a homologous blood transfusion which was subsequently shown to be caused by anti-Kp^c antibodies.

Publications

Ikeda K¹, Ohto H¹, Okuyama Y², Fujiwara M³, Kanamori H⁴, Fujiwara S⁵, Muroi K⁶, Mori T⁶, Kasama K, Iseki T⁷, Nagamura-Inoue T⁸, Fujii N⁹, Ashida T¹⁰, Kameda K, Kanda J¹¹, Hirose A¹², Takahashi T¹³, Nagai K¹⁴, Minakawa K¹, Tanosaki R¹⁵ (¹Fukushima Medical Univ, ²Komagome Hosp, ³Tohoku Univ, ⁴Kanagawa Cancer Center, ⁵Jichi Med Univ, ⁶Keio Univ, ⁷Chiba Univ, ⁸Tokyo Univ, ⁹Okayama Univ, ¹⁰Kindai Univ, ¹¹Saitama Med Center, ¹²Osaka City Univ, ¹³Shimane Univ, ¹⁴Nagasaki Univ,

¹⁵**National Cancer Center**). Adverse Events Associated With Infusion of Hematopoietic Stem Cell Products: A Prospective and Multicenter Surveillance Study. *Transfus Med Rev.* 2018 Jun 1. pii: S0887-7963(18)30023-3.

Sawamura Y¹, Ohto H², Ikeda K², Kanno T³, Suzuki Y², Gonda K², Tasaki T, Nolle KE², Takahashi H⁴, Aota S² (¹Miyagi Blood Center, ²Fukushima Univ, ³Fukushima Blood Center, ⁴Saitama National Institute of Public Health). Impact of prestorage leukoreduction of autologous

whole blood on length of hospital stay with a sub-group analysis in bilateral hip arthroplasty. *Vox*

Sang. 2018 Jun 20. doi: 10.1111/vox.12674.