

Department of Transfusion Medicine and Cell Therapy

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General Summary

In 1963, the Blood Transfusion Service division was established in The Jikei University Hospital. In 2018, the division was renamed the Department of Transfusion Medicine and Cell Therapy. The theme of the department's research has gradually changed over 57 years. The research initially dealt with transfusion testing and proper blood transfusion practices, but it recently shifted its focus to autologous blood transfusion and cell therapy using hematopoietic stem cells or dendritic cells. The present subjects of our research are categorized as follows: (1) improvement of transfusion testing, (2) proper storage and use of blood products, (3) adequate treatment or investigation of the cause of transfusion-related adverse events, (4) donation and transfusion of autologous blood, (5) collection, evaluation, and storage of hematopoietic stem cells, (6) support of dendritic cell therapy, and (7) education in the field of transfusion medicine.

Research Activities

Critical Reviews

Associate Professor Sato reviewed 2 articles that were published in *The New England Journal of Medicine*. In the first correspondence, he emphasized the importance of using ABO-matched platelet transfusions to decrease the risk of infrequent but preventable hemolytic transfusion, although the priority for donor-recipient ABO compatibility of plasma seems to be low in Western countries. In the second correspondence, he insisted that in the treatment of severe childhood anemia due to malaria, controlling the underlying disease with antimalarial agents should be given priority over increasing the red blood cell volume administered. Dr. Sato has advised medical students based on his research experience to read medical journals critically, which will upgrade their knowledge and motivate research.

Prevent bacterial contamination of blood products

Blood products for transfusion must be aseptically prepared. If saliva has adhered to the plastic needle of the transfusion set, the blood can be contaminated with bacteria. Therefore, to prevent such medical problems, we must wear masks and no talk when handling blood products for transfusion at a nurses' station or bedside. This information was presented by Yuta Furukawa, a medical technologist, at the 56th annual Kanto Kosienetsu regional congress of the Japanese Association of Medical Technologists in 2019.

A patient with a hemolytic reaction to antibiotics

We reported on a 42-year-old man with back pain and dyspnea a few minutes after receiving an antibiotic, micafungin sodium hydrate (MCFG). Because gross hematuria

was observed 4 hours later, a hemolytic reaction to MCFG was suspected. *In vitro* examination demonstrated that immune complexes, which included MCFG, had activated complement and induced hemolysis. This case was reported by Miyuki Ishibashi, a qualified medical technologist in transfusion medicine, at the 67th annual meeting of the Japan Society of Transfusion Medicine and Cell Therapy in 2019.

Multicenter collaborative research

1. Platelet transfusions for a patient with broad anti-HLA antibodies

Platelets matched for human lymphocyte antigen (HLA) are effective in elevating platelet counts of patients with platelet transfusion refractoriness due to anti-HLA antibodies. In an emergency situation, however, crossmatch-positive platelets are unavoidable. A 74-year-old woman with myelodysplastic syndrome received 30 consecutive HLA-matched platelet concentrate (PC) products, of which 23 were crossmatch-negative. The results of a crossmatch test for 7 PCs were inconclusive. The effectiveness of PCs was evaluated by calculating the 1-hour post-transfusion corrected count increment. Although crossmatch-negative PCs (n = 23) were more effective than other PCs (n = 7), the difference was not statistically significant. In conclusion, HLA-matched PCs other than crossmatch-negative HLA-matched PCs should be used without hesitation in emergency circumstances. This case report was published in the journal *Platelets* by Dr. Takeshi Hagino (Tama-Hokubu Medical Center).

2. The percentage of children having alloantibodies to red blood cells

We sought to clarify the percentage of children who received transfusions and were positive for alloantibodies against red blood cells using a cohort consisting of 17,376 children (1 to 19 years). The data were collected from 51 facilities in Japan. The rates of positive findings were categorized by age group: 1.93% (1 to 4 years), 1.89% (5 to 9 years), 3.01% (10 to 14 years), and 2.34% (15 to 19 years); the mean rate was 2.21%. The rates of production of alloantibodies by alloimmunization were 0.72% (1 to 4 years), 0.82% (5 to 9 years), 0.94% (10 to 14 years), and 1.56% (15 to 19 years). Among alloantibodies, anti-E was seen most frequently (39%). These findings were reported by Dr. Yoshiko Tamai (Hiroasaki University) at the 67th annual meeting of the Japan Society of Transfusion Medicine and Cell Therapy in 2019.

Publications

Sato T, Goto N, Tasaki T. Hemolytic Transfusion Reactions. *N Engl J Med.* 2019 Oct 3; **381**(14): 1396-1397. doi: 10.1056/NEJMc1910551. PubMed PMID: 31577896.

Sato T, Takahashi K, Tasaki T. Transfusion Timing and Volume in African Children with Severe Anemia. *N Engl J Med.* 2019 Oct 24; **381**(17): 1686-1687. doi: 10.1056/NEJMc1911668. PubMed PMID: 31644853.

Hagino T, Tsuno NH, Azuma F, Ohtani H, Matsui R, Someya C, Kato Y, Osanai S, Hidai H, Tsutsumi H, Akiyama H, Motomura S, Tasaki T. Multiple HLA-matched platelet transfusions for a single patient with broad anti-HLA antibodies: a case report. *Platelets.* 2019; **30**(6): 799-801. doi: 10.1080/09537104.2019.1609664. Epub 2019 May 8. PubMed PMID: 31068031.