Department of Transfusion Medicine

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General Summary

1. To implement appropriate and immediate action after transfusion-related adverse events, a preliminary online hemovigilance system was developed in 2007. As of December 31, 2011, a total of 56 hospitals were participating in the system.
2. In Japan, red-cell concentrates manufactured in blood centers using the additive solution mannitol-adenine-phosphate are required to be used within 3 weeks, although the shelf life had been 6 weeks until 1995. The main reason for the change was concern over contaminating bacteria, such as *Yersinia enterocolitica*, which could grow even at low temperatures (4˚C). On the other hand, the demand for blood usage has gradually increased with an ageing society and a low birthrate. These changes have also decreased the number of blood donors. The situation has put further pressure on efforts to maintain an adequate blood supply. Therefore, extension of the storage period is our focus, i.e., the shelf life of packed red cells should be increased to 6 weeks as before. To resolve the issue, the risk of bacterial contamination of stored blood derived from donors with symptoms of infectious disease was estimated accurately, taking cost-effectiveness into account.
3. Recently, several departments of transfusion medicine have engaged in so-called cell therapy in addition to routine transfusion testing or management of blood products. In our hospital, we have collected mononuclear cells with cell separators from patients with Buerger's disease, or arteriosclerosis obliterans, for use in their treatment. The close cooperation of specialists between transfusion medicine and clinical departments is essential for the development of cell therapy, including this vascular regeneration therapy.
4. In 1975, the World Health Assembly passed a resolution recommending the following: (1) whole-blood donation and supplementary plasmapheresis should be voluntary and unpaid, and (2) nations should try to become self-sufficient in blood and blood products. In 1983, however, one-third of plasma prepared in the world was used in Japan. Around that time, transmission of human immunodeficiency virus through unheated blood products became a subject of public concern. In the revised Act on Securing a Stable Supply of Safe Blood Products in 2002, the importance of self-supplying blood products by voluntary unpaid blood donors was clearly prescribed. Every hospital was required to make efforts to achieve this aim.
5. Although the quality and safety of allogeneic blood is extremely high, preoperative autologous blood donation is the norm in Japan for patients scheduled to undergo surgery requiring blood transfusion and for patients who prefer to use their own blood. The guidelines for autotransfusion are well established, but one unresolved issue is the suitability of donating autologous blood immediately after X-ray examination using a contrast medium.
6. Education in the best practices of transfusion medicine should be done for all medical

staff in the hospital, including medical students. Insufficient teaching staff is a problem in our hospital and is a common issue in departments of transfusion medicine in university hospitals in Japan.

Research Activities

1. According to data collected in 2011 from the online reporting system, the overall incidence of adverse events per transfusion bag was 1.02% (5,068 of 494,914). The incidence of adverse events was significantly higher for platelet concentrates (2.46%) than for red blood cells (0.53%) or fresh-frozen plasma (0.66%).
2. Because bacterial contamination in blood components is a serious problem, its incidence is being carefully investigated for various types of blood products to justify the extension of the storage period from 3 weeks to 6 weeks. This work is being supported by Grants-in-Aid for Scientific Research. In 2011, an accurate frequency of incidents was not obtained because the blood samples tested were not appropriately collected or stored. Improved evaluation is planned next year for blood specimens obtained from patients with mild fever or diarrhea or both.
3. From June 2006 through May 2010, 6 patients with Buerger's disease, or arteriosclerosis obliterans, were treated with their own peripheral hematopoietic stem cells. Four of them showed improvements in skin color, pain, and other signs and symptoms. This result was reported at the 59th annual meeting of the Japan Society of Transfusion Medicine and Cell Therapy.
4. Fever or urticaria is frequently encountered during the transfusion of blood products. Especially in patients who previously experienced severe adverse events, antihistamines or corticosteroids or both are administered before transfusion to prevent such reactions. In our retrospective study, the pretransfusion treatment was effective in patients receiving plasma-rich products, such as fresh-frozen plasma or platelet concentrates. However, no benefit was demonstrated when red blood cells were transfused. More thorough investigations should be done to determine the appropriate use of such drugs to prevent transfusion-related adverse events. Our findings were reported at the 59th annual meeting of the Japan Society of Transfusion Medicine and Cell Therapy.
5. We evaluated the quality of gadolinium-contaminated blood in terms of the degree of hemolysis, production of microaggregates, and red blood cell shape. Our findings suggest that the presence of such a contrast medium in blood is unlikely to induce deleterious effects on blood components.

Reviews and Books

Kato Y, Kamitamari A[1], Tajima A, Tamaki H, Itoh F, Hoshi Y, Kaneko T[2], Ida H ([1]Sasebo City Hosp, [2]Tokyo Metropolitan Child Med Ctr). Challenges in the management of an infant with severe hemophilia A and intracranial hemorrhage. *Nihon Syoni Ketsueki Gakkai Zasshi.* 2011; **25:** 130-4.