Department of Transfusion Medicine

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General Summary

1. Safe blood transfusions depend on lowering the risks from allogeneic blood units, which might be contaminated by infectious agents or inflammatory cytokines that have accumulated during storage, and on the appropriate use of transfusions. Educating medical and nursing students and practicing physicians about transfusion medicine is therefore extremely important for improving the safety of blood transfusions. Education includes the requirement that students perform transfusion testing. The tests they learn to perform include ABO typing, screening for irregular antibodies, and cross matching. They are also required to learn more about the blood program at the regional blood center.
2. Among the adverse reactions to blood transfusion, dyspnea has now become of greatest concern worldwide. Well-known causes of this adverse reaction include transfusion-related acute lung injury (TRALI), transfusion-associated circulatory overload (TACO), anaphylaxis, and transfusion of ABO-incompatible blood. Differentiating between TRALI and TACO is extremely important, because the treatment of each condition is quite different, although affected patients present with similar signs and symptoms. Therefore, clinically significant and useful diagnostic criteria are needed.
3. Diagnostic criteria for TRALI were established in 2004 at the consensus conference held in Toronto. However, the criteria did not refer to antileukocyte antibodies in the donor blood transfused to the patient, although the development of TRALI and dyspnea appears to be associated with antileukocyte antibodies, and the evaluation of antileukocyte antibodies for the diagnosis of TRALI is now being considered.
4. Various adverse reactions, such as nausea, vomiting, and fever, are observed after hematopoietic stem cell transplantation (HSCT), because of the simultaneous transfusion of an anticoagulant (acid-citrate-dextrose, heparin) and a cryoprotectant (dimethylsulfoxide). Detailed knowledge of the timing, types, and frequency of specific signs and symptoms associated with these reactions may be useful for developing preventive therapy.

Research Activities

1. Additional education on transfusion reactions includes teaching the residents about the appropriate management of transfusion-associated adverse reactions. Although the Japanese Red Cross Society and the Japan Society of Transfusion Medicine and Cell Therapy (JSTMCT) have been collecting information on adverse reactions, they cover too much information and appear to be inadequate educational resources. Fujii, Tasaki, and colleagues have created a practical guide for the management of transfusion reactions. This PDF guide was written in both English and Japanese and can be seen at the Website of the JSTMCT (http://yuketsu.jstmct.or.jp/). The significance of the guide in the education of transfusion medicine was reported at the International Society of Blood Transfusion meet-

ing held in Seoul, South Korea (Fujii Y et al. Vox Sang 107, 2014, 29–30).
2. To establish useful guidelines for the diagnosis of TACO, Tasaki, as the principal investigator, formed a study group with his colleagues in 2013, using a Health and Labour Science Research Grant. The new proposed definition of TACO is composed of 6 primary features and 5 items to support diagnosis. Twenty patients in whom TACO was diagnosed with guidelines proposed by the Japanese Red Cross were reinvestigated with the use of our new guidelines. Seven of 20 patients were diagnosed as transfusion associated dyspnea other than TACO, primarily because there was not enough of the type of data required by our guidelines to perform an accurate diagnosis. However, the results also indicated that proper evaluation of the patient's clinical signs and symptoms by a physician was the most important factor for the final diagnosis, although detailed laboratory data would be desirable.
3. The relationship between antileukocyte antibodies in donor blood and dyspnea in the recipients was investigated prospectively, because these antibodies are found in almost 30% of patients in whom TRALI is diagnosed. A total of 601 specimens from female donors of platelets were screened for antileukocyte antibodies. Seventy of 601 specimens (11.6%) were positive for the antibodies, and 24 of the 70 patients receiving the positive units were investigated for adverse reactions by examining their medical records. However, there was no significant relationship between the development of adverse reactions and the receipt of positive units. From 14 patients whose HLA typing had been completed, specific information on the antibodies in the platelet unit they had been given was identified with LABScreen Single Antigen assays. At least 1 locus of HLA was identical to the specificity of the antibodies in 3 patients, but no positive association with adverse reactions was seen. Because the occurrence of TRALI is rare, prospective validation of a positive association between antileukocyte antibodies in transfused blood products and the development of adverse reactions, such as dyspnea, seems difficult to perform by studying a small number of cases. These results were reported at the AABB meeting in Philadelphia (Tasaki T et al. Transfusion 54 (suppl), 2014).
4. A new study group was formed by Ohto et al. (Fukushima Medical University) to identify the adverse reactions associated with HSCT. As of May 2015, of 32 patients receiving HSCT, 18 (56.3%) had 1 or more adverse reactions, such as elevated blood pressure (9 patients), hematuria (12 patients), and fever (2 patients). However, to date, there have not been any serious reactions requiring emergent therapy.