Post-transfusion Graft Versus Host Disease in an Infant with Severe Combined Immunodeficiency

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Abstract
Background: Graft Versus Host Disease (GVHD) occurs when immunologically competent lymphocytes are introduced into an immunologically competent host. GVHD occurs after allogenic Bone Marrow Transfusion (BMT) and less often after transfusion of nonirradiated cellular blood components.

Case report: This 6 month-old male baby was referred with persistent pneumonia and poor weight gain since 4 months of his life. The parents are in close consanguinity and experience the death of their first baby who was a girl and expired with infection at early infancy. The patient’s data showed severe lymphocytopenia, severe hypogammaglobulinemia (undetectable serum IgG and IgM) and low CD4 count by flow cytometry. These findings are consistent with Severe Combined Immunodeficiency (SCID), which is a severe and fatal T-cell immunodeficiency. Intravenous immunoglobulin, antibiotics and systemic antifungal therapy were administered. Unfortunately he had received an emergency blood transfusion before confirmation of diagnosis. Two weeks later he developed pancytopenia, generalized erythematous sealy skin rash, hepatomegaly and cholestatic jaundice. Cyclosporine and steroid started due to suspected post-transfusion Graft Versus Host Disease (GVHD), but there was not enough time to observed the effect of drugs and he was expired.

Conclusion: There is an increased danger from TA-GVHD in part because of the frequent failure of physicians to recognize, and producing recipient BM aplasia. Post-transfusion GVHD is fatal in more than 90% of cases, primarily because of producing BM aplasia. The use of irradiated blood (>2500 cGy) is now recommended in high risk group including BMT recipients, congenital immunodeficiency syndromes, intrauterine transfusion, transfusion from first-degree blood relatives, and in Hodgkin’s lymphoma. GVHD continues to be a rare but extremely serious complication of blood transfusion.

Key words: grafts versus host disease, combined immunodeficiency, bone marrow Transplantation

Introduction

Graft-Versus-Host Disease (GVHD) results from the engraftment of immunocompetent donor T lymphocytes into a recipient, whose immune system is unable to reject them. It is a common sequela of bone marrow transplantation, but is also recognized as a rare risk associated with blood transfusion. Early reports of transfusion-associated TA-GVHD were recognized in immunocompromised hosts. However, cases have been
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Discussion

Virtually all cellular blood components have been implicated in reported cases of TA-GVHD. The dosage of immunocompetent cells transfused is also important. Based on animal studies, a minimum dose of 1 x 10^7 cells/kg body weight is necessary to induce a "running syndrome" and case studies suggest that a similar threshold is necessary to produce GVHD in man. There have been reports of fatal TA-GVHD, however, occurring in children with severe combined immunodeficiency in which a dose of only 8 x 10^4 lymphocytes/kg body weight appeared to be transfused.

GVHD following blood transfusions manifests a an acute syndrome, the onset typically occurring within 4 to 30 days. The syndrome is characterized by dysfunction of the skin, liver, gastrointestinal tract and bone marrow. The initial clinical manifestations are usually a high fever occurring 8 to 10 days after the transfusion, followed within 24 to 48 hours by the appearance of a central maculopapular rash which subsequently spreads to the extremities. In severe cases, the rash may progress to generalized erythroderma and desquamation. Additional clinical findings may include anorexia, nausea, vomiting and watery diarrhea with or without elevated liver enzymes and hyperbilirubinemia. Unlike GVHD following BMT, pancytopenia is a prominent finding in TA-GVHD. The duration of TA-GVHD is short with the majority of patients dying within a few days to weeks (median time 21 days from onset), usually due to complications of marrow failure. A review of the clinical manifestations of TA-GVHD in neonates has shown that infants present later (median time of onset 28 days) with a slightly prolonged course. However they have a similar high rate of mortality.
While immunosuppressive therapies such as prednisone, cyclosporine and antithymocyte globulin have been used to treat GVHD associated with BMT, this approach has not been effective for TA-GVHD which is nearly uniformly fatal. Since the treatment of TA-GVHD is almost always ineffective, efforts have been made to prevent and minimize the risk by reducing or inactivating transfused donor lymphocytes. The methods available in blood banks this approach has not been effective for TA-GVHD which is nearly uniformly fatal. Since the treatment of TA-GVHD is almost always ineffective, efforts have been made to prevent and minimize the risk by reducing or inactivating transfused donor lymphocytes. The methods available in blood banks physically to remove T-lymphocytes through washing or filtration do not provide effective prophylaxis against TA-GVHD. Current leukocyte reduction filters, which can achieve a 3-log reduction in leukocyte content of components, cannot guarantee removal of sufficient lymphocytes to prevent TA-GVHD. Inactivation of transfused lymphocytes by γ-irradiation of blood components remains the most effective method for inhibiting lymphocyte blast transformation and mitotic activity and hence the prevention of TA-GVHD. The current recommended dose of irradiation is 25 Gy to the midplane of the component with a minimum of 15 Gy to any other region of the component.

**Conclusion**

There is an increase danger from TA-GVHD in part because of the frequent failure of physicians to recognize, and producing recipient BM aplasia. Post transfusion GVHD is fatal in more than 90% of cases, primarily because of producing BM aplasia. The use of irradiated blood (>2500 cGy) is now recommended in high risk group including BMT recipients, congenital immunodeficiency syndromes, Intrauterine transfusion, transfusion from first-degree blood relatives, and in Hodgkin’s lymphoma. Directed donations by family members should be discouraged (they are less likely to transmit infection); lacking other options, the blood products from family members should always be irradiated. GVHD continues to be a rare but extremely serious complication of blood transfusion.

**References**

10. Siddhantani RA, Halusha FG, Dock NL et al. Graft-versus-host disease associated with transfusion of

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**Table 1: Risk Groups for Transfusion-associated Graft Versus Host Disease**

<table>
<thead>
<tr>
<th>Risk defined</th>
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<tr>
<td>Bone marrow transplant recipients</td>
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<td>Patients with severe cellular immuno deficiencies</td>
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<tr>
<td>Fetuses who receive in utero transfusion</td>
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<tr>
<td>Recipients of blood directed from a biologic relative</td>
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<tr>
<td>Hodgkin disease</td>
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**Risk under review**

| Premature newborns |
| Hematologic malignancies other than Hodgkin Disease |
| Solid tumors |
| Organ transplant recipients |

**No risks defined**

| Term newborns |
| AIDS |

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