

New York State Council on Human Blood and Transfusion Services

*GUIDELINES FOR IRRADIATION OF
BLOOD AND BLOOD COMPONENTS*

Second Edition
2004

New York State Council on Human Blood and Transfusion Services
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GUIDELINES FOR IRRADIATION OF BLOOD AND BLOOD COMPONENTS

INTRODUCTION

1. Post-transfusion graft-vs-host disease (GVHD) is a serious risk for certain severely immunosuppressed or immunodeficient patients. Cellular components and fresh plasma for at-risk patients should be irradiated with a minimum of 2,500 cGy prior to transfusion. Medical evidence suggests that irradiation is not necessary for plasma components that have been frozen, such as fresh frozen plasma (FFP) and cryoprecipitate. GVHD has been reported in immunocompetent recipients who have received HLA-matched components or blood from an individual with a similar HLA haplotype, such as a close relative. Scientific evidence suggests that donor lymphocytes of similar HLA type are not perceived as foreign and therefore not destroyed by the recipient's immune system. Leukoreduction does not adequately reduce the risk of GVHD.
2. Acute transfusion-associated GVHD is caused by engrafted donor lymphocytes that produce an almost invariably fatal syndrome, usually including dermatitis, high fever, hepatitis, severe gastrointestinal symptoms, and panmarrow suppression -- however, all of these conditions may have various other causes in such patients. The symptoms arise within four to 30 days after transfusion, and death usually ensues within the first month after symptoms. The disease cannot be treated effectively. Occasionally, chronic GVHD may appear some 100 days after transfusion, producing a scleroderma-like syndrome.
3. Irradiation with 2,500-3,000 cGy has not been demonstrated to alter significantly the lifespan or function of platelets or polymorphonuclear leukocytes. Irradiation does reduce red blood cell (RBC) viability, and the expiration date for irradiated RBCs is the usual expiration date of the unit, or 28 days from the day of irradiation, whichever is earlier.
4. At present, no data are available to support the speculation that administration of irradiated blood components carries any immediate or long-term risks other than those associated with similar non-irradiated components.
5. Irradiated units are not radioactive and require no special handling.
6. Irradiated units may be used for patients other than the intended patient. There is no evidence that this practice is harmful.

RECOMMENDATIONS

Irradiation of blood components with a minimum of 2,500 cGy before transfusion is recommended for:

1. patients who have had or who may be having hematopoietic progenitor cell transplants, either allogeneic or autogeneic, including those with aplastic anemia, thalassemia, certain malignancies, and other conditions;
2. patients with congenital immunodeficiency syndromes;
3. fetuses receiving intrauterine transfusions;
4. infants receiving exchange transfusions or undergoing extracorporeal membrane oxygenation;
5. premature infants < 1200g birthweight;
6. patients with Hodgkin's disease;
7. patients with leukemia or non-Hodgkin's lymphoma;
8. patients receiving HLA-matched components or blood from blood relatives. There may also be increased risk of GVHD for individuals transfused with blood from other members of a genetically related group; and
9. all granulocytes used for transfusion.

Irradiation of blood components may be considered for patients who have received a solid organ transplant and are considered to be immunosuppressed. Irradiation may be useful for other patients undergoing intensive chemotherapy or immunosuppressive therapy for oncologic or non-oncologic conditions.

Clinicians should notify their transfusion services or blood banks of any patients who should receive ONLY irradiated cellular blood components, so that patient records may be designated appropriately.

REQUIREMENTS

Equipment for irradiation of blood and blood components must be appropriately licensed and calibrated, with preventive maintenance measures documented as recommended by the manufacturer.

PERTINENT LITERATURE

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