Irradiation of Blood Products Guide for Vanderbilt University Medical Center (VUMC)

Purpose of document: Provide VUMC healthcare providers with clear guidance on clinical situations that require blood product irradiation. Document advantages and disadvantages.

The VUMC blood bank is located at 4650 TVC (phone is 2-2233), website https://www.mc.vanderbilt.edu/root/vumc.php?site=vmcpathology&doc=39082

Indication: Prevention of transfusion associated graft versus host disease (TA-GVHD), a uniformly fatal complication.

TA-GVHD: complication of transfusion of viable lymphocytes from allogeneic blood (RBC, platelets, granulocytes) to immunosuppressed recipient. Disparity of donor and recipient HLA types results in donor T lymphocyte activation—skin, gut, liver, bone marrow destruction.

Clinical Features of TA-GVHD: 1-2 weeks after transfusion development of fever, maculopapular rash, diarrhea, hepatitis, and bone marrow hypoplasia.

Diagnosis: Biopsy proven donor lymphocyte persistence (RFLP of donor WBC needed)

Prevention of TA-GVHD: Irradiation. VUMC blood bank uses Cesium-137 gamma irradiation to inactivate donor lymphocytes by delivering a minimum of 25 Gy to the blood product.

Who should receive irradiated blood products?

1. Stem cell transplant patients (either peripheral blood or bone marrow)
2. Directed donors
3. Chemotherapeutic treatment with: purine analogous (fludarabine, cladribine, bendamustine, clofarabine, and deoxycoformicin [pentostatin])
4. Patients treated with alemtuzumab (anti-CD52)
5. Intrauterine transfusion
6. Congenital Immunodeficiency (eg SCID, DiGeorge syndrome)
7. Neonatal transfusion (<4 months of life)

Who should NOT receive irradiated blood products? Routine surgery patients, solid tumor patients, HIV patients, autoimmune disease, solid organ transplantation

Disadvantage of irradiation? Increases supernatant potassium level of RBC product, alters inventory outdate, increased turn-around time for blood product orders

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