



### Acute Pain Transfusion Reaction

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A 34-year-old woman with a diagnosis of hemophagocytic lymphohistiocytosis (HLH) received a double umbilical cord blood transplantation following a myeloablative chemotherapy preparative regimen with busulfan and cyclophosphamide. HLH is a rare, potentially fatal hematologic disorder characterized by the overactivation of histiocytes and T lymphocytes, leading to organ infiltration and acute illness. On day 25 post-transplantation, the patient required a platelet transfusion for a platelet count of 6,000 per ml (normal range = 150,000–450,000 per ml). The patient's blood type prior to the cord blood transplantation was B positive and, although both umbilical cord blood donors were O positive, the patient was still B positive per blood bank testing on that day. Although the recipient of an allogeneic stem cell transplantation will eventually become the blood type of the donor, the time for this process to occur varies for each person. That process must be monitored by the blood bank for the purpose of cross-matching blood products to decrease hemolysis as much as possible. The patient was premedicated with the facility's standard for platelet transfusions: acetaminophen 650 mg and diphenhydramine 25 mg about 30 minutes prior to the platelet transfusion.

Baseline vital signs were heart rate, 108 bpm; blood pressure, 135/96; temperature, 97.2°F; respirations, 12; and O<sub>2</sub> saturation, 98%. The unit and patient identification was confirmed by a second RN for accuracy. The platelet transfusion was given through the patient's Port-a-Cath® via y-type, leukopoor-filtered tubing primed with 0.9% normal saline. An apheresed, leukocyte-reduced, cytomegalovirus (CMV)-negative, O-positive unit was transfused. Vital signs remained unremarkable throughout the 15-minute infusion. The

patient was talkative and showed no visible signs or symptoms of a transfusion reaction.

About five minutes after transfusion completion, the patient called staff into her room and was visibly distressed, reporting excruciating pain in all of her joints, particularly the large joints of the hips and lower back. Erythema was noted in the face and neck. Vital signs were taken with blood pressure, 163/106; heart rate, 131 bpm; temperature, 97.9°F; and O<sub>2</sub> saturation, 97%. Blood pressure and heart rate remained consistently elevated during this 15-minute post-transfusion reaction and the patient remained afebrile. Meperidine 75 mg was given via IV push as well as a 1 mg IV bolus of hydromorphone. The patient was already receiving hydromorphone through a patient-controlled analgesia pump for severe mucositis at the time of the event. After about 15 minutes, the patient's vital signs returned to baseline and the severe, acute pain episode subsided, with complete resolution of lingering joint pain after several more hours. A complete post-transfusion analysis was conducted per hospital policy, beginning with bedside confirmation of correct product and patient identification. Blood samples and urine specimens were obtained. A direct antiglobulin test (DAT) also was performed showing 2+ reactivity. A positive DAT indicates that some degree of hemolysis of red blood cells has occurred and is measured on a range of minimally reactive to 4+ reactivity.

#### Reaction to Transfusion

The patient in the case study experienced what is known as an acute pain transfusion reaction (APTR). The current medical and nursing literature is limited regarding discussion of this

type of transfusion reaction. APTR is rare, poorly understood, and can occur during or after the transfusion of blood products. The published reports on cases of APTR describe clinical manifestations consistent with those experienced by the patient in the case study. APTR is a diagnosis of exclusion, as other causes of blood transfusion reactions must be ruled out first based on negative laboratory analysis (Davenport, 2012). Although the positive DAT found in this case study is consistent with the minor hemolysis that likely occurred because of the ABO blood type mismatch of the transfused unit and patient, the pathology report and post-transfusion reaction analysis were otherwise negative.

Although APTRs are rarely documented, some studies have reported on this specific type of transfusion reaction. Orton et al. (2001) retrospectively studied 29,814 medical records of patients receiving blood transfusions in four large medical facilities. Transfusion reactions occurred in 146 patients, with 12 reports identified specifically as APTRs (representing 8% of all transfusion events). Of those 12 patients, all experienced severe chest, back, or proximal extremity pain. Other manifestations were tachypnea and/or dyspnea (n = 6), hypertension (n = 5), chills (n = 4), and one instance of tachycardia (Orton et al., 2001). Other authors who have published reports on this acute reaction describe similar manifestations. Alvarado-Ramy et al. (2006) evaluated 29 patients who experienced back pain during the transfusion of red blood cells. Schonegevel, McDonald, and Badami (2008) reported on two patients with acute and severe pain to the lower back and/or hips. One patient also experienced severe hypertension (blood pressure of 217/125) and another experienced dyspnea (Schonegevel et al., 2008).