

# Prevention of Dimethylsulfoxide-Related Nausea and Vomiting by Prophylactic Administration of Ondansetron for Patients Receiving Autologous Cryopreserved Peripheral Blood Stem Cells

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**A**utologous peripheral blood stem cell transplantation (ASCT) is used most commonly for the treatment of lymphoma and multiple myeloma, with more than 30,000 ASCTs performed worldwide in 2009 (Pasquini & Wang, 2011). ASCT requires collection and cryopreservation of autologous peripheral blood stem cells (PBSCs). Before the reinfusion of PBSCs, patients must undergo conditioning with high-dose radiation and/or chemotherapy. PBSCs typically are mobilized from patients using chemotherapy and hematopoietic growth factors such as filgrastim or granulocyte macrophage-colony-stimulating factor, or growth factors alone. Once the PBSCs have been mobilized from the bone marrow into the blood, they are collected by apheresis and then cryopreserved for reinfusion at a later time point. To protect the cells from damage associated with freezing and thawing, a cryoprotectant is required in the cryopreservation process. Common methods of cryopreservation include 10% v/v dimethylsulfoxide (DMSO), or 5% v/v DMSO with or without hydroxyethyl starch (Abrahamsen, Rusten, Bakken, & Bruserud, 2004; Kessinger & Sharp, 2003; Liseth et al., 2009; Rowley, MacLeod, Heimfeld, Holmberg, & Bensinger, 1999). PBSCs can be frozen for an extended period of time, although a maximum duration has not yet been established (Berz, McCormack, Winer, Colvin, & Quesenberry, 2007).

After mobilization chemotherapy and PBSC collection and storage, most patients are given about 30 days to recover before proceeding with the high-dose transplantation conditioning regimen. Different high-dose agents are used depending on the underlying disease and clinical setting. After completion of high-dose therapy, cryopreserved PBSCs usually are thawed rapidly at the bedside and infused without further manipulation beginning on “day 0.” Prior to the infusion, patients require IV hydration. To prevent reactions related to histamine release caused by the DMSO,

**Purpose/Objectives:** To evaluate the effectiveness of ondansetron for the prevention of nausea and vomiting from dimethylsulfoxide (DMSO) during autologous stem cell transplantation (ASCT) infusion.

**Design:** Nonrandomized cohort using historical control.

**Setting:** Comprehensive cancer center outpatient infusion department.

**Sample:** 50 patients receiving ASCT in the outpatient setting.

**Methods:** Patients were assessed for nausea and vomiting on their infusion day using the Multinational Association of Supportive Care in Cancer Antiemesis Tool (MAT) at arrival, pre-ASCT infusion, pre-ondansetron administration, prior to the first bag, and after each bag of stem cells. A standard script was used to ensure consistency. Ondansetron, 16 mg IV, was administered 30–90 minutes prior to each ASCT infusion. Number and volume of stem cells bags, as well as infusion rate and emesis episodes, were recorded. Nausea scores and vomiting episodes were compared to historical data.

**Main Research Variables:** Subjectivity of nausea, potential Hawthorne Effect.

**Findings:** Forty-five percent of patients had an MAT score greater than 2 on arrival, decreasing to 18% after receiving ondansetron before the first bag. Twenty-four percent had MAT increases of more than two points by infusion end compared to 58% in the historic control group. Eighteen percent of patients vomited compared to 28% of historic controls.

**Conclusions:** The administration of 16 mg of IV ondansetron significantly reduced DMSO-related nausea and episodes of vomiting in patients receiving ASCT.

**Implications for Nursing:** Prophylactic administration of ondansetron had a positive effect on reducing nausea symptoms and episodes of vomiting during ASCT infusions. These results prompted a change in clinical practice. More research is required to determine whether the inclusion of other antiemetic agents would provide even greater benefit.

**Knowledge Translation:** To date, no other published studies have explored the benefits of premedicating patients with ondansetron prior to ASCT infusions. This study is the first to establish efficacy of ondansetron for an unlabeled indication. These results may pave the way for future research in decreasing nausea and vomiting in this setting.