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APPROPRIATE ICU UTILIZATION FOR BMT PATIENTS

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Purpose: To develop criteria to ensure appropriate admission of BMT patients to the ICU. In order to avoid inappropriate ICU days, guidelines were developed and a process outlined to improve communication between the BMT and ICU teams, and the teams and the family. **Background:** Appropriate resource utilization is critical with rising health care costs and the scarcity of ICU beds. Guidelines were needed for the appropriate admission of BMT patients to the ICU.

Communication between medical teams was often fragmented. Additionally family members often receive conflicting information from the teams. Unclear communication makes it difficult for patients and families to make educated decisions regarding care options, which can result in over utilization of the ICU for non-beneficial care. **Procedure:** Our BMT program had an increase in ICU utilization, with ICU days increased from 3.3% in FY05 to 5.1% in FY06. Average BMT ICU LOS increased from 4.8 days to 11.7 days.

A multidisciplinary team met to discuss current issues, brainstorm ideas and create guidelines based on current literature. The following guidelines were developed:

- Guidelines for appropriate admission of BMT patients to the ICU are based on review of recent literature and probability of survival.
- Established daily rounds between BMT and ICU teams to discuss patients in the ICU and enhance communication.
- The BMT and ICU team meet with the patient or family every 48 hours during ICU stay to clarify goals of care.
- BMT ICU monitoring tool developed to monitor adherence to guidelines.
- All BMT patients sent to ICU are reviewed at the monthly BMT meetings.
- Created a BMT Advanced Care Planning addendum to educate patients and families and create a forum for discussion and goal planning with their MD.

Results: To date, all but one of the 13 BMT patients transfered to the ICU met the criteria. The BMT and ICU teams have rounded daily and discussed the plan for all BMT patients in the ICU. In addition the teams have met with families every 3–4 days. As a result, we have decreased BMT ICU days to 3.4% and the ICU average LOS down to 8.1 days.

The project has resulted in guidelines for appropriate admissions of BMT patients to the ICU. Appropriate utilization of ICU beds for BMT patients results in better resource utilization and avoiding futile care. The daily team rounds and family meetings team resulted in clarity of information and communication to patients and family, enabling families to make educated decisions.

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PRIORITY CONCERNS OF PATIENTS RECEIVING AUTOLOGOUS OR ALLOGENEIC STEM CELL TRANSPLANTS AT THE SEATTLE CANCER CARE ALLIANCE

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Purpose: In a focused history, transplant clinicians may not address the issues perceived to be most important to patients. Studies indicate that while oncologists are attentive to adverse symptoms, communication tends to be clinician-oriented with interruptions and closed-ended questions. The use of touchscreen computers by stem cell transplant (SCT) patients to report symptom and quality of life (QOL) measures has been investigated at the SCCA. The purpose of this analysis was to identify priority concerns reported at the time of nurse teaching (T1) and after transplant (T2), using a self-report assessment program for cancer (ESRA-C). **Methods:** 228 SCT patients included in this analysis completed ESRA-C at T1 and T2 before their clinic visits. The ESRA-C includes validated questionnaires to assess symptoms and QOL and an open-ended text field with the following instructions: "Please type in the two most important concerns or issues that we should address first with you and/or anything else you want to tell us about." The results were content analyzed by grouping the 139 allogeneic (allo) and 89 autologous (auto) patients and identifying concerns and symptom categories and commonalities in the written text responses. **Results:** Patient characteristics included 57% men and 77% with post-secondary education. Free text entries were more frequent at T1. Four common global concerns were reported at T1: financial, survival, QOL, family/caregiver issues and one symptom, depression. The two areas of highest concern were 1) financial, greater in the auto group (13.5% vs 3.5%); and 2) survival, more common in the allo group (13.0% vs 7.9%). Eight of the common symptoms/side effects were categorized: fatigue, complications of graft versus host, diarrhea, nausea, appetite loss and infection. The symptoms, as opposed to global concerns, were reported as priority concerns most often at T2. **Conclusions:** Computerized assessment is a novel way for patients to report a spectrum of symptoms and quality of life status, and also what is most important for that individual. Financial concerns are not typically addressed by clinicians, particularly when attempting to teach patients and prepare them for transplant. This particular concern could block the patient's ability to process and retain information about treatment and side effects. Priority concerns shifted in both groups from global concerns at T1 to symptom concerns at T2. This shift has implications for patient education.

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DEFINING THE SYMPTOM BURDEN OF CHRONIC GRAFT VERSUS HOST DISEASE

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Significance: Chronic graft-versus-host disease (cGVHD) is an autoimmune-like reaction occurring after allogeneic hematopoietic stem cell transplantation (HSCT). cGVHD causes debilitating symptoms for patients who have been cured of underlying malignancies. Oncology nursing aims to decrease the burden of symptoms for patients and families. **Problem and Purpose:** There is scant literature addressing the symptom burden of cGVHD. The major barrier to good symptom management is inadequate assessment. The specific aims of this study are to: 1) describe the symptom experience of cGVHD; and 2) establish the content domain for an instrument to measure the symptom burden of cGVHD. **Theoretical/Scientific Framework:** The framework for this study is the concept of symptom burden. Symptom burden is the combined impact of all symptoms on one's ability to function as one did prior to onset of disease and therapy. **Methods and Analysis:** This was a qualitative, cross-sectional study. The study sample included 20 adults with active cGVHD at a comprehensive cancer center in the southern United States. Participants described their experience of having cGVHD in single audiotaped dialogues. Using an exploratory descriptive method, the researcher analyzed transcripts of the dialogues and developed themes of the cGVHD symptom experience. To ensure accuracy, identification of themes by the researcher was reviewed and confirmed by 3 other researchers experienced in qualitative analysis, oncology nursing, symptom assessment, and HSCT. The themes were used to construct a unified description of the symptom burden of cGVHD. **Findings and Implications:** The symptom burden of cGVHD is multiple symptoms that interfere with daily activities and require self-care management. Symptom burden increases the longer the symptoms persist and the more uncertain the occurrence of the symptoms and the outcome

of the treatment are. The content domain of a patient-reported instrument to measure the symptom burden of cGVHD should include questions about the severity of numerous symptoms and how those symptoms have interfered with normal functioning. Symptom burden should be measured longitudinally to capture changes in symptom burden over time. Clinicians caring for patients with cGVHD should reduce uncertainty as much as possible by offering clear explanations and should support patients in appropriate efforts at self-care to relieve symptoms.

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CLONAZEPAM PLUS LEVETIRACETAM (CL) FOR THE PREVENTION OF BUSULFAN-INDUCED SEIZURES: A SINGLE CENTER EXPERIENCE

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High dose busulfan (>1 mg/kg) used in hematopoietic stem cell transplant (HSCT) conditioning regimens is associated with a decrease in seizure threshold which can result in partial or generalized seizures in up to 10% of people without a previous seizure history. Phenytoin is the most frequently used agent to prevent seizures. Though this is an effective therapy, the frequent side effects and significant risk for drug interactions from phenytoin make it a suboptimal agent for this purpose. Also there is no preferred anti-seizure prophylaxis for phenytoin allergic or intolerant patients. A retrospective review was performed of a single center experience using CL in 46 consecutive patients receiving a variety of inpatient and outpatient busulfan-containing regimens to assess it for side effects and efficacy. The patients received the CL regimen over a 13 month period beginning July, 2006. Clonazepam 0.5 mg and levetiracetam 500 mg where given together orally twice daily, beginning the evening before busulfan therapy initiated until discontinuation on the morning after the final busulfan dose was given. All patients were adults, 20 female/26 male, aged 22–75 years, (mean 52, median 56 y/o), weight 54–113 kg (Mean and median 82 kg), with no prior history of seizures. They received HSCT conditioning regimens containing oral (PO) busulfan 1 mg/kg/dose × 12–16 doses, or intravenous (IV) busulfan 3.2 mg/kg/day × 1–3 days as part of the following regimens: 5 - busulfan (12 mg/kg PO)/melphalan(100 mg/m^2)/thiotepa 500 mg/m^2), 4 - busulfan (9.6 mg/kg IV)/melphalan(100 mg/m^2)/thiotepa 500 mg/m^2), 20 - busulfan (16 mg/kg) PO/cyclophosphamide (120 mg/m^2), and 16 - busulfan 3.2 mg/kg IV/fludarabine (120 mg/m^2/TBI (200 cGy). The regimen was completely successful with no patients experiencing any type of seizure within 48 hours of their last dose of busulfan. Side effects were mild: 2 patients reporting mild sedation and 1 patient had their levetiracetam dose reduced to 250 mg twice daily for confusion. When compared to the prior 104 patients receiving the same variety of conditioning regimens with phenytoin anti-seizure prophylaxis, fewer side effects were seen, with equal anti-seizure benefits and a limited risk for drug interactions using the CL regimen. The CL regimen is now the preferred therapy for busulfan seizure prophylaxis for the transplant center.

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METHOTREXATE AND PIPERACILLIN/TAZOBACTAM VERSUS METHOTREXATE AND CEFTAZIDIME: A LOOK AT TIME TO ENGRAFTMENT AND SIDE EFFECT PROFILE DIFFERENCES IN HEMATOPOIETIC STEM CELL TRANSPLANT PATIENTS

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Many HSCT patients receive methotrexate for GVHD prophylaxis. Commonly, methotrexate is given on days +1, +3, +6, and variably +11. Most patients develop fever during this time period and empiric antibiotics are started.

In June 2006, our institution's SOP changed the empiric antibiotic for fever from ceftazidime to piperacillin/tazobactam. Penicillin derivatives interact with antineoplastic doses of methotrexate by competing for renal tubular binding sites. Methotrexate toxicity may include severe mucositis, marrow suppression, renal dysfunction, and hepatotoxicity. Smaller doses of methotrexate, like those used for GVHD prophylaxis, have not been investigated. We evaluated side effects in patients who may have prolonged methotrexate exposure caused by piperacillin/tazobactam co-administration.

We examined 36 patients over two years who received methotrexate for GVHD prophylaxis, comparing patients who received cephalosporins with those receiving piperacillin/tazobactam. The cephalosporin group included 23 patients (14 females, 9 males), from July 1, 2005 to June 30, 2006. Average time to engraftment (the first of three consecutive days with ANC > 500) was 18.25 (range 12–22) days for matched unrelated donor (MUD) transplants, 11.9 (9–20) for matched sibling (MS) transplants, and 16.33 (14–19) for mismatched related transplants; overall average for this group was 16.04 days to engraft. The piperacillin/tazobactam group included a total of 13 patients (11 males, 2 females), from July 1, 2006 to June 30, 2007. MUD transplants averaged 20.2 (16–23) days, and MS transplants 17.4 (15–22); overall average was 18.7 days to engraft. Average days antibiotics overlapped methotrexate was 6.17 and 5.46 for cephalosporin and piperacillin/tazobactam groups, respectively. No significant differences in transaminases, bilirubin, and serum creatinine were noted.

In summary, only a difference in time to engraftment was found, with the piperacillin/tazobactam group taking 2.66 days longer. This study is limited by small sample size and potential confounding variables. Mucositis severity could not be compared in this retrospective study, but would be of interest for future studies. Based on this small, retrospective single institution study, we conclude that a major interaction between small doses of methotrexate and piperacillin/tazobactam is not seen.

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HIGH RATE OF REVACCINATION IN ALLOGENEIC AND EARLY AUTOLOGOUS STEM CELL TRANSPLANTATION — RESULTS OF A SINGLE CENTER COMPLIANCE TRACKING SURVEY

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Background: Hematopoietic stem cell transplants (HSCT) have increased over the past 25 years. With improving HSCT outcomes, the number of long-term survivors has grown. HSCT recipients lose their memory immune response against common vaccine-preventable infections and suffer from life-threatening late infectious complications. Revaccination is an important strategy for reducing the risk of preventable infections after HSCT. **Materials and Methods:** After the implementation of an annual post transplant clinic, compliance with revaccination recommendations of the Infectious Disease Working Party of the EBMT (BMT 2005) was analyzed. Initially letters were sent to patients greater than 1 year post transplant inviting them to visit the clinic. The goal of the annual clinic was to educate HSCT recipients, identify complications, and recommend therapy for long-term post-transplant issues. Patients were encouraged to bring their immunization records to their appointments. Data were collected from January 2006 until August 2007 utilizing patient histories and computer data base documentation tools for the clinic. Schedules were generated based on the recommendations of the Infectious Diseases Working Party of the EBMT. **Results:** 42 subjects, 27 autologous and 15 allogeneic, attended annual clinic during this time period. 27 patients had initiated the recommended vaccination schedule and/or elected to start or continue the re-immunization schedule after attending the clinic. Fifteen patients declined vaccinations (11 autos and 4 allos) for various reasons including time out from transplant (median 10 years), 1 completed recommended series, 1 due to immunosuppressive therapy, and 1 with history of adverse reaction to vaccine excipients. Patients declining full revaccination were encouraged to maintain standard revaccinations such as yearly influenza shots and ten year diphtheria/tetanus boosters. There were no toxicities associated with revaccination. **Conclusion:** Education and