PHARMACY ORAL

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EVOLUTION OF THE PHARMACY PRACTICE MODEL TO IMPROVE PATIENT AND LEARNER OUTCOMES: A PARTNERSHIP IN PATIENT CARE INITIATIVE (PIPC) IN THE HSCT POPULATION

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Recent studies by the American Society of Bone Marrow Transplantation (ASBMT) have projected an increase in the number of hematopoietic stem cell transplants (HSCT) in the coming years, which will grow the need for clinical pharmacists specialized in caring for HSCT patients. However, major deterrents to meeting this increased demand of HSCT Clinical Pharmacists are the low capacity of residency training programs and exposure to HSCT as a student or resident learner.

The Partnership in Patient Care (PIPC) initiative is a joint effort between the UNC Eshelman School of Pharmacy and the UNC Hospitals’ Department of Pharmacy, with a goal to improve patient care by expanding patient care services of the pharmacy team, while improving the overall experience and capacity for learners. The HSCT acute care service, as part of the PIPC initiative, conducted a pilot program to evaluate the feasibility of increasing learner capacity while expanding pharmacy services. The pilot represented a paradigm shift from a model where the clinical specialist (CS) was the major driver of outcomes to the CS evolving into an Attending Pharmacist (AP) and managing a pharmacy team to drive the direct patient care outcomes. A layered learning practice model (LLPM) was created where the AP oversees Decentral Pharmacists (DP), a resident, and a student. Improvements during the LLPM allowed 100% capture rate of new admission medication histories, completion of all patients’ pre-discharge insurance benefits investigation, accomplishing 100% compliance for the National Patient Safety Goals of medication reconciliation and discharge counseling, and formal documentation of pharmacy activities in the patient’s electronic medical record (Table 1). Mobilizing learners through the LLPM allowed them more time spent directly with the patient to create a stronger pharmacist-patient relationship. The ability of the AP to delegate responsibilities for pharmacy activities increased educational opportunities and increased the sense of ownership to offer a wider range of pharmacy services to the patient and for the medical team. While challenges exist and the model requires further improvements to create sustainability, the patient benefits gained during these pilots are significant enough to pursue continuation of this model in the HSCT setting.

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CORRELATION OF MEDICATION BURDEN AND QUALITY OF LIFE IN ALLOGENIC HEMATOPOIETIC STEM CELL TRANSPLANT PATIENTS


Background: Literature suggests medication burden is related to patient satisfaction; this relationship has not been examined in allogeneic hematopoietic stem cell transplant (aHSCT) patients. We...
previously reported aHSCT patients take a median of 17 (range 3-49) medications daily at Mayo Clinic. This study aimed to determine if medication burden correlates with quality of life (QoL) at 1 year following HSCT.

**Methods:** As part of an ongoing, IRB approved QoL study we examined the cross-sectional relationship between medication burden and QoL among all adult aHSCT patients with adequate documentation and follow-up between 7/1/09 and 9/30/10. Medication burden was assessed by number of scheduled medications, maximum possible doses and maximum possible pills per day reconciled by a pharmacist pre-HSCT and 1 year post-HSCT. QoL was assessed by the Functional Assessment of Cancer Therapy (FACT)-General (version 4) during pre-HSCT evaluation and FACT-BMT 1 year post-HSCT.

**Results:** During the study period, 57 patients received an aHSCT and enrolled in the QoL study; 43 patients were included. Patients were excluded for death before 1 year (n = 13), incomplete medication record (n = 1), missing post-HSCT QoL data (n = 2). Median patient age was 55 years (range of 24-71), 50% of patients were male and most patients had an ECOG performance score of 0 or 1 (n = 1 ECOG of 2). Pre-HSCT total scheduled pills per day negatively correlated with social well-being. Pre-HSCT, a higher number of maximum possible pills per day (scheduled and prn) was associated with worse pre-transplant QoL across domains of physical, social, functional, and overall well-being. The associations with physical, social, and total well-being remained significant after adjustment for age, gender, and ECOG performance score. A higher pre-HSCT maximum possible pills per day correlates with worse physical and overall well being 1-year post-HSCT. Post-transplant a higher number of maximum possible pills per day negatively correlated with physical, functional, and overall well-being 1 year post-transplant, even after covariate adjustment.

**Conclusion:** These data offer preliminary evidence that maximum daily pill count (scheduled and prn) might be a significant predictor of QoL among HSCT recipients. Better understanding of which aspects of medication burden (e.g., pill count, medication type) affect domains of QoL may help identify possible medication management strategies to improve QoL.

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EFFECT OF CYTOXAN DOSING ON HEMATOPOIETIC STEM CELL (HSC) MOBILIZATION EFFICACY, TOXICITY, AND COST IN SUCCESSIVE COHORTS OF NON-HODGKIN’S LYMPHOMA (NHL) PATIENTS

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**Background:** Cyclophosphamide (Cy) has been shown to be an effective regimen for HSC mobilization in NHL patients undergoing autologous stem cell transplantation (ASCT). However, the optimal dose to be used, which maximizes HSC collection yields while minimizing febrile neutropenia and other toxicities, remains controversial. Three successive cohorts of NHL patients who received G-CSF and Cy at doses of either 4g/m² (Cy4), 2g/m² (Cy2) or 3g/m² (Cy3) were compared.

**Methods:** 51 pts undergoing Cy3 mobilization between October 2009 and August 2011 were retrospectively analyzed and compared to our historical Cy2 (n = 28) and Cy4 (n = 28) data. Minimal and optimal yield was defined as collection of ≥2 x 10⁶ CD34+ cells/kg in 2 days being 87% and 82%, respectively vs. 39% for Cy2 (p < 0.001). In contrast, toxicity, as measured by % febrile neutropenia and median hospitalization days, favored Cy2 (0%, 0d) compared with Cy3 (32%, 4d, p = 0.002), with Cy3 falling intermediate between these groups (16%, 3d). Requirement for Plerixafor was significantly higher for both Cy2 (32%) and Cy3 (42%), compared with Cy4 (4%, p = 0.003). Relative cost clearly favored Cy4, when accounting for the combined costs of Cy, G-CSF, plerixafor, hospitalization, and apheresis, with Cy3 and Cy2 costing approximately 37% and 47% more, respectively, per patient mobilization.

**Conclusions:** Although Cy2, 3, and 4 are all effective mobilizing regimens, collection efficiency, toxicity, and cost vary greatly. Both Cy3 and Cy4 improve collection efficiency, at the expense of increased hospitalization, particularly with Cy4. Cy4 appears to maximize collection efficiency while minimizing plerixafor use and overall cost. Further improvements in supportive care strategies to reduce the incidence of febrile neutropenia and associated hospitalization are clearly needed.

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Table.

<table>
<thead>
<tr>
<th>Cy2 (n = 28)</th>
<th>Cy3 (n = 31)</th>
<th>Cy4 (n = 28)</th>
<th>P-value</th>
<th>Cy2 vs Cy3</th>
<th>Cy2 vs Cy4</th>
<th>Cy3 vs Cy4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect &gt;2x10⁶ in ≤2 days</td>
<td>39%</td>
<td>87%</td>
<td>82%</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Collect &lt;2x10⁶ in ≤2 days</td>
<td>14%</td>
<td>42%</td>
<td>46%</td>
<td>0.022</td>
<td>0.019</td>
<td>0.009</td>
</tr>
<tr>
<td>Collect &lt;2x10⁶ in all days</td>
<td>18%</td>
<td>45%</td>
<td>64%</td>
<td>0.002</td>
<td>0.025</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Median # of collections</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0.001</td>
<td>0.001</td>
<td>0.135</td>
</tr>
<tr>
<td>Hospitalization Days (median)</td>
<td>0.5</td>
<td>1.6</td>
<td>3.2</td>
<td>0.004</td>
<td>0.033</td>
<td>0.002</td>
</tr>
<tr>
<td>Days of G-CSF (median)</td>
<td>11.5</td>
<td>12.5</td>
<td>10.5</td>
<td>n.s</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>% Pts receiving plerixafor</td>
<td>32%</td>
<td>42%</td>
<td>4%</td>
<td>0.003</td>
<td>0.437</td>
<td>0.005</td>
</tr>
</tbody>
</table>

**Pairwise Comparison (significant if p-value<0.017 based on Bonferroni adjustment)**

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ONCE DAILY DOSE (ODD) LORAZEPAM (LO) FOR SEIZURE PROPHYLAXIS IN CONJUNCTION WITH ONCE DAILY DOSE BUSULFAN (BU) FOR PEDIATRIC PATIENTS UNDERGOING REDUCED INTENSITY CONDITIONING (RIC) FOR ALLOGENIC HEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT)

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BU is an alkylating agent used as part of conditioning for HSCT. It is known to cause seizures in the 3rd and 4th day of