Implications of dose-rounding of intravenous chemotherapy at a community-based hospital

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Disclosure Statement

The following individuals have nothing to disclose regarding possible financial or personal relationships with commercial entities (or their competitors) that may be referenced in this presentation.

- Wilbert J. Fuerte, Pharm.D.
- Omparkash Gopalani, BS, RPh
- Judy Tseng, Pharm.D., BCPS
Clinical Setting

- South Miami Hospital
- Approximate annual oncology census
  - 7500 inpatients
  - 400 outpatients
Presentation Objective

- Describe the evidence for dose-rounding single-dose IV chemotherapy
- Emphasize the benefits of dose-rounding single-dose IV chemotherapy
- Describe the feasibility of dose-rounding IV chemotherapy at a community-based hospital
Background

- Chemotherapy medications
  - Leading class associated with medication expenditure
    - Trend expected to continue

- Benefits of dose-rounding protocols
  - Reduction in medication expenditure and waste disposal

- Increasing number of studies showing benefits
  - Patel et al \(^5\)
    - Yearly estimated savings of ~ $37,000 by rounding the dose of rituximab to the nearest vial size using a 5% dose deviation
  - Brenda et al \(^1\)
    - Estimated cost-saving of $24,434 over a 3-month period
Reasons for Not Rounding

- Concerns related to reduced clinical outcomes
- Lack of validated protocol
- Unaware of medication price and shortage
- Concerns related to time
Study Outcomes

Purpose

• Evaluate the feasibility and cost-saving potential of dose-rounding by a pharmacist and recommend potential medications for an automatic dose-rounding protocol.

Outcomes

• Quantify and evaluate the total number of pharmacist interventions completed for dose-rounding of single-dose IV chemotherapy medications.

• Calculate the cost savings associated with dose-rounding of single-dose IV chemotherapy medications.

• Identify the 5 most commonly prescribed medications yielding the most cost-savings.
Methods

- Prospective, single-center, IRB-approved interventional study
- Conducted at South Miami Hospital from December 14\textsuperscript{th} 2013 to March 14\textsuperscript{th} 2014

Inclusion Criteria
- All oncology patients 18 years of age and older receiving single-dose vial IV chemotherapy agents during the study period

Exclusion Criteria
- Patients receiving chemotherapy agents formulated in multidosage vials
- Patients receiving chemotherapy agents for and indication other than cancer
Methods

- Data collection
  - Notification of order by IV room pharmacist
  - Notification of order by outpatient oncology staff

- Intervention
  - Dose-rounding based on 5% limit criteria
Data Collection

- mg per vial
- Dose prescribed
- Dose meeting 5% dose-rounding limit criteria?
- Number of vials before rounding
  - Number of vials after rounding
- Number of vials saved per dose
  - Cost of vial
- Total US dollars saved per dose
Results

159 orders reviewed for 51 patients

123 (77%) Included

14 (11%) Met 5% criteria*

109 (89%) Did NOT meet 5% criteria

36 (23%) Excluded

Reasons for exclusion
- 33 Multi-dose vials
- 3 Non-cancer indication

*All interventions were made by phone and were accepted by the prescriber
# Results

<table>
<thead>
<tr>
<th>Medication</th>
<th>Doses Rounded</th>
<th>Amount of patients rounded</th>
<th>Amount Saved (US Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avastin (Bevacizumab)</td>
<td>6</td>
<td>3*</td>
<td>3,739.02</td>
</tr>
<tr>
<td>Alimta (Pemetrexed)</td>
<td>1</td>
<td>1</td>
<td>2,831.76</td>
</tr>
<tr>
<td>Rituxan (Rituximab)</td>
<td>2</td>
<td>1</td>
<td>1,317.30</td>
</tr>
<tr>
<td>Doxil (Liposomal Doxorubicin)</td>
<td>1</td>
<td>1</td>
<td>1,131.00</td>
</tr>
<tr>
<td>Cytoxan (Cyclophosphamide)</td>
<td>2</td>
<td>1</td>
<td>516.98</td>
</tr>
<tr>
<td>Taxotere (Docetaxel)</td>
<td>1</td>
<td>1</td>
<td>94.21</td>
</tr>
<tr>
<td>Adriamycin (Conventional Doxorubicin)</td>
<td>1</td>
<td>1</td>
<td>4.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>9,634.51</strong></td>
</tr>
</tbody>
</table>

*Patient 1 received 3 doses, patient 2 received 2 doses, and patient 3 received 1 dose*
### Results

<table>
<thead>
<tr>
<th>Medication</th>
<th>Doses prescribed</th>
<th>Vial price (US dollars)</th>
<th>Potential Savings (US dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doxorubicin (Liposomal)</td>
<td>17</td>
<td>1,132</td>
<td>19,244</td>
</tr>
<tr>
<td>Bevacizumab</td>
<td>11</td>
<td>623</td>
<td>6,853</td>
</tr>
<tr>
<td>Rituximab</td>
<td>7</td>
<td>659</td>
<td>4,613</td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>16</td>
<td>258</td>
<td>4,128</td>
</tr>
<tr>
<td>Pemetrexed</td>
<td>1</td>
<td>2,832</td>
<td>2,832</td>
</tr>
<tr>
<td>Docetaxel</td>
<td>19</td>
<td>94</td>
<td>1,786</td>
</tr>
<tr>
<td>Doxorubicin (Conventional)</td>
<td>11</td>
<td>4</td>
<td>44</td>
</tr>
</tbody>
</table>
Conclusions

- Dose-rounding interventions by a pharmacist is feasible

- Significant cost-savings are possible due to the dose-rounding of IV chemotherapeutic agents

- The 5 most commonly prescribed medications yielding the most cost-savings were doxorubicin (liposomal), bevacizumab, rituximab, cyclophosphamidé, and pemetrexed
Limitations

- Single-center study
- Short study period
- Small sample size

Future directions

- Implement an automatic dose-rounding protocol
Self Assessment

Which of the following are established benefits of a dose-rounding protocol of chemotherapy medications?

☆ a- Cost-savings

☆ b- Reduction of waste disposal

☆ c- Improved clinical outcomes

☆ d- Two of the above

☆ e- All of the above
Acknowledgments

- Co-investigators
  - Omparkash Gopalani, BS, RPh
  - Judy Tseng, Pharm.D., BCPS

- Oncology Nursing Staff

- SMH Pharmacy Staff


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