Evaluation of Weight-Based Dosing and Prescribing Practices of Intravenous Immunoglobulin—A Retrospective Medical Records Review

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Inpatient Results:

<table>
<thead>
<tr>
<th>Inpatient Groups</th>
<th>Pre-Default Weight Change (n, %)</th>
<th>Post-Default Weight Change (n, %)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients receiving premedication</td>
<td>16 (50%)</td>
<td>23 (92%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Patients experiencing ADRs</td>
<td>5 (15.6%)</td>
<td>6 (24%)</td>
<td>0.508</td>
</tr>
<tr>
<td>Patients receiving ADRs despite premedication</td>
<td>2 (40%)</td>
<td>1 (83.3%)</td>
<td>0.242</td>
</tr>
<tr>
<td>Patients receiving IVIG for indications outside of BIDMC guidelines</td>
<td>10 (31.25%)</td>
<td>8 (32%)</td>
<td>0.952</td>
</tr>
<tr>
<td>Patients receiving doses outside of BIDMC guidelines</td>
<td>2 (6.25%)</td>
<td>5 (20%)</td>
<td>0.221</td>
</tr>
<tr>
<td>Patients receiving doses calculated using the incorrect type of weight</td>
<td>9 (28.1%)</td>
<td>7 (28%)</td>
<td>0.992</td>
</tr>
<tr>
<td>Obese patients incorrectly dosed using Actual Body Weight (ABW)</td>
<td>8 (25%)</td>
<td>2 (8%)</td>
<td>0.160</td>
</tr>
</tbody>
</table>

Average cost of IVIG therapy per inpatient = $5,734.42
Average potential cost-savings per inpatient = $781.90

*Post-default weight change incorrect dosing strategies: 1 patient with Myasthenia Gravis given higher dose than recommended, no rationale; 1 patient with Hypogammaglobulinemia given lower dose 3 days rather than 1 dose x 1 day due to IVIG infusion reaction; 3 patients with ITP (1 x 6); early due to successful response, 2 dosed per heme team recommendations

**Analysis:**

- **Inpatient Results:**
  - 2 patients (10.5%) experienced ADRs
  - 5 patients (26.3%) received doses outside of BIDMC guidelines & 5 patients (26.3%) received IVIG for indications outside BIDMC guidelines
  - 6 obese patients (31.6%) were dosed using ABW; 2 obese patients (10.5%) were not dosed using weight-based dosing
  - Average cost per infusion = $1,069.88
  - Average potential cost-saving had correct dosing weight was used in every patient: $341.21/misdosed infusion, and $597.13/misdosed patient

- **Non-Preferred Brand Results:**
  - 53.3% of patients on Gamunex are receiving this product due to a history of adverse reactions and therefore cannot be switched to another product
  - 46.7% patients on Gamunex and 23.5% on Gammagard S/D require further review of appropriateness to switch to Gammagard
  - 88.2% of patients on Gammagard S/D that can’t be switched due to low IgA levels

**Observations:**

- **Opportunity:**
  - Evaluate the effect of the 2015 change in default weight based dosing guideline change to determine if more providers used the actual body weight and outpatient product selection

- **Approach:**
  - Design:
    - Single center, retrospective medical records review from January 2009 to February 2018
  - Data source:
    - BIDMC pharmacy database, online medical records (webOMR), and computerized physician order entry (CPOE)
  - Data collected:
    - Location: inpatient (pre- and post-2015 guideline change) and outpatient
    - Inpatient significance level: α=0.05
    - Patient demographics (age, gender, height, weight)
    - Product ordered/dispensed
    - Indication
    - Cost/Cost Savings
    - Daily dose - both g/kg and total
    - Number of days/dosing schedule
    - IgA levels
    - Adverse Reactions

**Value Proposition:**

- This addresses the problem of overspending and inappropriate dosing of IVIG therapy with improved clinical decision support.

**Impact:**

- **Value Proposition:**
  - The unique feature about my research is that this will influence future prescribing practices at a leading hospital.
  - This addresses the problem of overspending and inappropriate dosing of IVIG therapy with improved clinical decision support.

- **Conclusions:**
  - Cost-saving opportunities exist with added stewardship for appropriate use and dosing of IVIG
  - Careful attention to patient weight, especially in obese patients, should be a priority when calculating dose
  - Increased stewardship may result in less potential for dosing errors
  - Added clinical decision support is needed for weight based dosing and indication dosing
  - Outpatients require periodic review of product selection to ensure cost-savings and safety

**Next Steps:**

- Review and switch outpatients that were determined to be able to switch, or that required further review in order to switch, from a non-preferred brand to Gammagard Liquid, BIDMC's preferred brand for cost-savings.
- Update BIDMC's guidelines and CPOE IVIG order sets with compendia supported indications for IVIG use
- Consider increasing stewardship over inpatient and outpatient weight-based dosing of IVIG

**Conclusion:**

The unique feature about my research is that this will influence future prescribing practices at a leading hospital. This addresses the problem of overspending and inappropriate dosing of IVIG therapy with improved clinical decision support.