Pharmacist Pilot Project to Reduce Hypoglycemic Events on Internal Medicine Unit

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Pharmacist Pilot Project to Reduce Hypoglycemic Events on Internal Medicine Unit

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Background

- Hypoglycemia has been identified as one of the most common preventable adverse drug events (ADEs) in the hospital setting.
- Hospitalized patients are an especially vulnerable population and need carefully balanced blood glucose levels.
  - Hypoglycemia may lead to decrease wound healing time and affect the immune response.¹
  - Hypoglycemia may lead to prolonged hospital stay, poor prognosis, and death.²
- Studies have linked intensive blood glucose control with an increase in mortality rates, and the American Diabetes Association (ADA) recommends less stringent goal of 140-180 mg/dL in most patients who are hospitalized.
- The Washington State Hospital Association (WSHA) has identified preventing hypoglycemia event (defined as a blood glucose level of less than 50 mg/dL) through multidisciplinary coordination as a high priority.³
- Providence Health System has adopted the WSHA goal of reducing hypoglycemic events to less than or equal to 4.5% events per month.
- In 2019, the selected large tertiary hospital had an overall hypoglycemia score of 2.93% with an individual score of 3.82% on the medical A unit with 26 patients with a blood glucose < 50 mg/dL out of total of 680 patients inpatient on insulin or oral agents. Although the hospital is still below the goal of less than 4.5% there is always room for improvement.
- Clinical pharmacists are well-equipped to provide meaningful interventions in collaboration with physicians and nurses to improve patient care outcomes and reduce overall episodes of hypoglycemia.

Purpose

- The objective of this study is to evaluate the impact of medication-related interventions made by pharmacists and pharmacy students on an internal medicine unit at a large tertiary medical center in reducing the number of hypoglycemic events on the unit.
- This study will also evaluate to what degree medication-related recommendations were implemented by the hospitalists and the effect on repeat hypoglycemia events in patients with previous hypoglycemic events over the course of the patient’s hospital stay.

Preliminary Results

Table 1: Patient Demographics (n = 5)

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Patient A</th>
<th>Patient B</th>
<th>Patient C</th>
<th>Patient D</th>
<th>Patient E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>66</td>
<td>45</td>
<td>53</td>
<td>29</td>
<td>76</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>Male</td>
<td>Male</td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>Diabetes Type</td>
<td>Type 2</td>
<td>Type 2 (new onset)</td>
<td>LADA</td>
<td>Type 1</td>
<td>Type 2</td>
</tr>
<tr>
<td>A1c</td>
<td>7.6%</td>
<td>9.7%</td>
<td>8.2%</td>
<td>13.3%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Blood glucose level</td>
<td>67 mg/dL</td>
<td>62 mg/dL</td>
<td>48 mg/dL</td>
<td>67 mg/dL</td>
<td>64 mg/dL</td>
</tr>
<tr>
<td>PTA insulin (basal)</td>
<td>Glargine 33 units daily</td>
<td>n/a</td>
<td>Glargine 35 units daily</td>
<td>Basaglar 20 units daily</td>
<td>Glargine 40 units BID</td>
</tr>
<tr>
<td>PTA insulin (bolus)</td>
<td>Lispro 18 units at breakfast, 14 units at lunch, 14 units at dinner</td>
<td>n/a</td>
<td>Lispro 12 units TID + moderate SSI</td>
<td>Aspart carb ratio of 1:15</td>
<td>Lispro 40 units TID with meals</td>
</tr>
<tr>
<td>Inpatient insulin (basal) prior to event</td>
<td>Glargine 15 units daily</td>
<td>Glargine 15 units daily</td>
<td>Glargine 20 units daily</td>
<td>Glargine 20 units BID</td>
<td></td>
</tr>
<tr>
<td>Inpatient insulin (bolus) prior to event</td>
<td>Lispro 18 units at breakfast, 14 units at lunch, 5 units at dinner + moderate SSI</td>
<td>Moderate SSI</td>
<td>Low SSI</td>
<td>Low SSI</td>
<td></td>
</tr>
<tr>
<td>Pharmacist intervention response</td>
<td>Accepted</td>
<td>Rejected</td>
<td>Accepted</td>
<td>Accepted</td>
<td>Rejected</td>
</tr>
<tr>
<td>Inpatient insulin (basal) after event</td>
<td>Glargine 15 units daily</td>
<td>Glargine 10 units daily</td>
<td>Glargine 5 units daily</td>
<td>Glargine 17 units daily</td>
<td>Glargine 10 units daily</td>
</tr>
<tr>
<td>Inpatient insulin (bolus) after event</td>
<td>Lispro 10 units TID</td>
<td>Moderate SSI</td>
<td>Low SSI</td>
<td>Low SSI</td>
<td>n/a</td>
</tr>
</tbody>
</table>

PTA: prior to admission; BID: twice daily; LADA: latent autoimmune diabetes; SSI: sliding scale insulin; PTA: prior to admission

Figure 1: Adverse Drug Event-Hypoglycemia on an Internal Medicine Unit

Number of patients with a blood glucose < 50 mg/dL out of total number of inpatients on insulin or oral agents

- Nov-20: 2 out of 60; Dec-20: 3 out of 62; Jan-21: 5 out of 74; Feb-21: 4 out of 84; March-21: 0 out of 66

* Repeat BG events < 50 within 30 minutes of previous event excluded

Methodology

This study is exempt by Institutional Review Board

Study Design:
- A protocol for pharmacists, residents, and students to review episodes of hypoglycemia on an internal medicine unit and provide interventions for prevention of recurrent events.
- Retrospective chart review of interventions made by pharmacists from the pilot on one internal medicine unit.

Study period:
- February 2021 – May 2021

Inclusion Criteria:
- Adults ≥18
- Receiving insulin or other antihyperglycemic medications
- A blood glucose level of ≤ 70 mg/dL

Exclusion criteria:
- Children or adolescents < 18 years
- Insulin pump that is continued while inpatient
- Patients who were admitted with hypoglycemia, unless blood glucose falls below 70 mg/dL after being stabilized
- Blood glucose readings outside of the designated internal medicine units (emergency department readings)

Discussion

Preliminary Results

- The pilot project went live February 12th, 2021.
- Daily profile review by pharmacists of patient with a blood glucose of 70 mg/dL or less and recommendations made via MD page or progress note.
- Initial data shows that there continues to be room for improvement in hypoglycemic events on an internal medicine unit.
- Pharmacist interventions were accepted on three out of five patients identified on the internal medicine unit.

Limitations

- Control group with which to compare data is not available.
- The study has not yet reached the sample size required for adequate power to assess significance.
- Study period of three months may not have allowed adequate time for accurate assessment of pharmacist interventions.
- COVID-19 pandemic may influence number of possible events.

Next Steps

- Continue data collection on hypoglycemic events, interventions made, and acceptance of interventions.
- Potential to develop a collaborative practice agreement allowing pharmacists to assist in the management of inpatient glycemic control.
- Develop education for nursing and pharmacists on common pitfalls to avoid with glucose management.

References