Morning Insulin Regimen Optimization from Residents’ Behavior: Can morning educational activity affect inpatient glycemic control?

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Introduction
- Obtaining appropriate inpatient glycemic control has multiple prognostic benefits for the diabetic population.
- Daily insulin titration is considered the standard of practice. However, no current literature has suggested the optimal time to place in order morning insulin regimen adjustment.
- This study is aimed to find the possible effect of the mandatory morning educational conferences on the timing of insulin regimen adjustments and inpatient morning glycemic control.

Methods
- Retrospective review of electronic medical records of diabetic patients admitted to UPMC Harrisburg hospital from Jan 01- Mar 31th, 2019. Each hospital day of one diabetic patient is considered one record.
- Inclusion criteria:
  ✓ Patients admitted to the service of the residents
- Exclusion criteria:
  ✓ Patients with ESRD, HHS or DKA
  ✓ Patients on glucocorticoid therapy
- Data obtained:
  ✓ Time of fasting and pre-lunch glucose checks along with their respective value of glucose level (mg/dl)
  ✓ Time of order entry and the time of fasting insulin injection
- Insulin orders entered before 08:30 were considered as before the morning conferences, insulin orders after 08:30 were considered as after the morning conferences.

Results

<table>
<thead>
<tr>
<th>Insulin order time</th>
<th>No. (%)</th>
<th>Morning insulin dose adjusted Number (%)</th>
<th>Average fasting BG (SD)</th>
<th>Average pre-lunch BG (SD)</th>
<th>Change in BG (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 08:30</td>
<td>505 (81.5)</td>
<td>491 (97.23)</td>
<td>169.3 (59.3)</td>
<td>175.5 (71.1)</td>
<td>6.2 (63.3)</td>
</tr>
<tr>
<td>After 08:30</td>
<td>115 (18.5)</td>
<td>52 (45.22)</td>
<td>187.5 (59.4)</td>
<td>189.6 (68.3)</td>
<td>2.1 (72.7)</td>
</tr>
</tbody>
</table>

- Among 620 records included:
  ✓ There were 505 (81.5%) hospital days where residents placed in insulin orders before morning conferences
  ✓ There were 115 (18.5%) hospital days were residents placed in insulin orders after the morning conferences
- Average changes of the fasting and pre-lunch glucose levels were +6.2 and +2.1 mg/dl respectively in both groups.
- No statistical difference noted (p=0.575) between the fasting and pre-lunch glucose levels regardless of the time of order placed in for morning insulin regimen adjustment.
- However, nearly all (97.23%, 491/505 records) of the patients with insulin order placed before the morning conference received the adjusted insulin dose.
- Almost half (45.22%, 52/115 records) of the patients with insulin order placed after the morning conference received the adjusted insulin dose.
- Difference in the proportions of patients receiving adjusted regimens in the morning was statistically significant (p<0.001).

Discussion
- Delay of insulin order entry could lead to suboptimal morning insulin dosage administration.
- No statistically significant difference was found in inpatient glycemic control.
- Limitations:
  ✓ Small sample size
  ✓ Intractability of the mealtime
- Future study needed with a larger population and standardized meal time to clarify the benefit timely optimization of morning insulin regimens.