Inpatient Glycemic Management: How We Get Others To Follow Our Lead
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San Diego, CA

Disclosure to Participants
Disclosures:
Advisory Board Meetings:
Alliance (Boehringer-Ingelheim/Lilly)
Bayer Diabetes Care
Sanofi Diabetes
Consulting: Johnson & Johnson Diabetes Institute

TOPICS
- Hardwiring in the EMR to promote safety & efficacy
- Patient Education: Multi-media resources, generic skills instructions
- Staff Education: Diabetes Champions, Clinical standards & pocket cards
- Transitional Care & Preventing Readmissions

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Hardwiring Glycemic Control
**Why Hardwire Insulin Orders?**

- **Reduces insulin dosing errors:**
  Auto-calculate safe dose, can set dose limits
- **Simplifies and promotes weight based dosing:**
  EX: Auto-populates weight into dosing algorithm
- **Reduces insulin type order errors:**
  Basal, prandial & correction insulin orders separated
- **Reduces insulin delivery timing errors:** Separate prandial & bedtime doses, Doses due are color coded

**Step One**

**Which Order Set Do I Choose?**

- **NYPH Basal/Bolus Insulin Order Sets**
  
  **Comprehensive Insulin Order Set at NYPH**

- **Type of Diabetes**
  
  **Bedside BGM**
  
  Defaults to ac & bedtime for prandial orders & q6 hrs for NPO

- **Carb Controlled Meal Plan**
  
  **Auto-select A1c if needed**

  *Build Medical Logic Memory to auto-check if no A1C for >60 days*

  Auto-Selects 60 gram Carb Controlled Meal Plan
NPO: no auto-basal for type 2
Suggest .10 u/kg for T1DM
Very Low Dose .10 u/kg
Low Dose .15 u/kg
Med Dose .20 u/kg
High Dose .30 u/kg

Insulin Titration Algorithm: Step 1

WHICH INSULIN NEEDS ADJUSTMENT:
If AM fasting BG is too high or low:
Adjust Glargine
If pre-lunch, pre-dinner or bedtime is too high or low:
Adjust Aspart

HOW TO ADJUST:
If BG is less than 50:
Deduct 50%
If BG is less than 70:
Deduct 20%
If BG is 70-100:
Deduct 10%
If BG is 180-250:
Add 10%
If BG is >250:
Add 20%

Insulin Titration Algorithm: Step 2
How to increase aspart insulin dose when High Dose Order Set Is Not Enough

DIABETES MEDICATION ADJUSTMENTS PRIOR TO PROCEDURE AND SURGERY

Medications | Day Before Procedure or Surgery | Day of Procedure or Surgery
--- | --- | ---
Oral sulfonylureas: glyburide (Micronase®), glipizide (Glucotrol®), glimepiride (Amaryl®) | Take only morning and/or lunch doses | None
Sodium-Glucose Co-Transporter 2 Inhibitor (SGLT-2): canagliflozin (Invokana®), dapagliflozin (Farxiga®), empagliflozin (Jardiance®) | Stop taking any medications including combinations containing SGLT-2s 3-5 days before surgery or procedure | None
All other oral agents | Take usual dose(s) | None
Rapid/Short acting insulins: regular (Humulin® R, Novolin® R), lispro (Humalog®), aspart (Novolog®), glulisine (Apidra®) | Before meals: Take usual dose | None
Insulin NPH Humulin® N, Novolin® N | Morning dose: Take usual dose | None
High Dose Order Set Is Not Enough: T1DM: Reduce dose by 20% | T2DM: Reduce dose by 50% | None
DIABETES MEDICATION ADJUSTMENTS PRIOR TO PROCEDURE AND SURGERY (Cont.)

Medications | Day Before Procedure or Surgery | Day of Procedure or Surgery
--- | --- | ---
Long-acting basal insulin: U100 glargine (Lantus®), U100 detemir (Levemir®), U300 glargine (Toujeo®), U100 & U200 degludec (Tresiba®) | AM and/or PM dose: Reduce 20% | None
Pre-Mixed Insulin Novolin® 70/30, Novolog® Mix 70/30, Humalog® Mix 75/25 | Morning dose: Take 100% | T1DM: Reduce dinner dose by 20% | T2DM: Do not take
Insulin Pumps Ask patient to contact PCP/endocrinologist for orders, or reduce all basal rates by 20% for outpatients. Endocrine/Maternal Fetal Medicine consult mandatory for all inpatients
Timing is Everything

Teaching Diabetes Survival Skills

Carb Controlled Menus: Grams vs. Servings

Great Teaching Tool!

Insulin Pen Teaching

Safety
- RN Education: Be Aware: Don’t Share
- Barcoding insulin type & PATIENT ID on one label
- Barcode fails: 2 RN
- Pen returned to pt specific drawer right after use

Patient Education
- Generic Pen Handouts
- Teaching Kits
- Label Saline Pens: “Do Not Inject”

Diabetes Education Documentation

Staff Education: Be Creative
- Unit Based Education
- Online learning
- Case Studies
- Grand Rounds
- Pocket Cards
- Team Web Sites
- Games
- See AADE Inpatient Management Listserve for ideas
**Diabetes Champions**

- Intensive then ongoing additional education for clinicians: e.g. RNs, NPs, PAs, RDs, PharmDs
- Focus on management AND education
- Champions serve as unit based resource
- Most impact if house-wide & interdisciplinary

**Diabetes Prescription Writing**

- **Basal**: Lantus U100 or Toujeo U300 Solostar Pen® or Levemir or Tresiba U100 or U200 FlexTouch Pen®
- **Pre-Mix**: NovoLog Mix 70/30 Flexpen® or Humalog Mix 75/25 KwikPen®
- **Bolus**: NovoLog Flexpen® or Humalog KwikPen®

**Insulin Safety:** What to do about new concentrations

- U-100 = 100 units/ml
- U-200 = 200 units/ml
- U-300 = 300 units/ml
- U-500 = 500 units/ml

**Transitional Care**

- **From Inpatient to Outpatient**

<table>
<thead>
<tr>
<th>A1C ≤ 7%</th>
<th>7-9%</th>
<th>&gt; 9%</th>
</tr>
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<tbody>
<tr>
<td>Return to original regimen PTA if not contraindicated</td>
<td>Basal needs &amp; goal achieved if not contraindicated</td>
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</tr>
<tr>
<td>Best option: Basal insulin as 75-100% of current dose &amp; bolus insulin with meals at fixed or calculated dose</td>
<td>Other options:</td>
<td>Other options:</td>
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<tr>
<td>• Basal plus (basal qd + bolus at largest meal)</td>
<td>• Pre-mixed insulin before breakfast &amp; dinner</td>
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<td>• Basal insulin qd + repaglinide with meals</td>
<td>• Basal insulin qd &amp; GLP-1 daily or weekly to cover prandial needs</td>
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</tr>
</tbody>
</table>

- **Basal Insulins**: aspart, lispro, glulisine
- **Basal Insulins**: degludec U100 & U200, detemir, glargine U100 & U300
- **Pre-Mixed Insulins**: aspart 70/30 & lispro 75/25

**References**